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NATIONAL PETROLEUM NEWS

NEW Refining Technology EDITION

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DECEMBER 29, 1937

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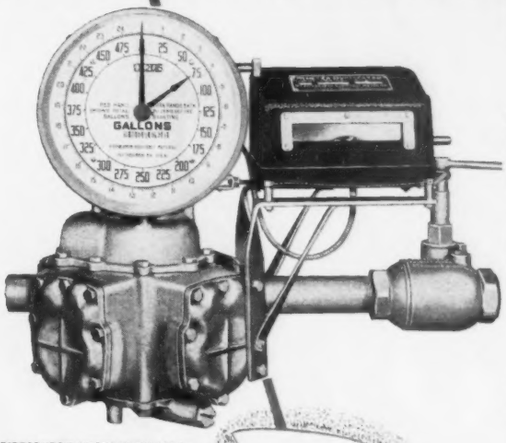

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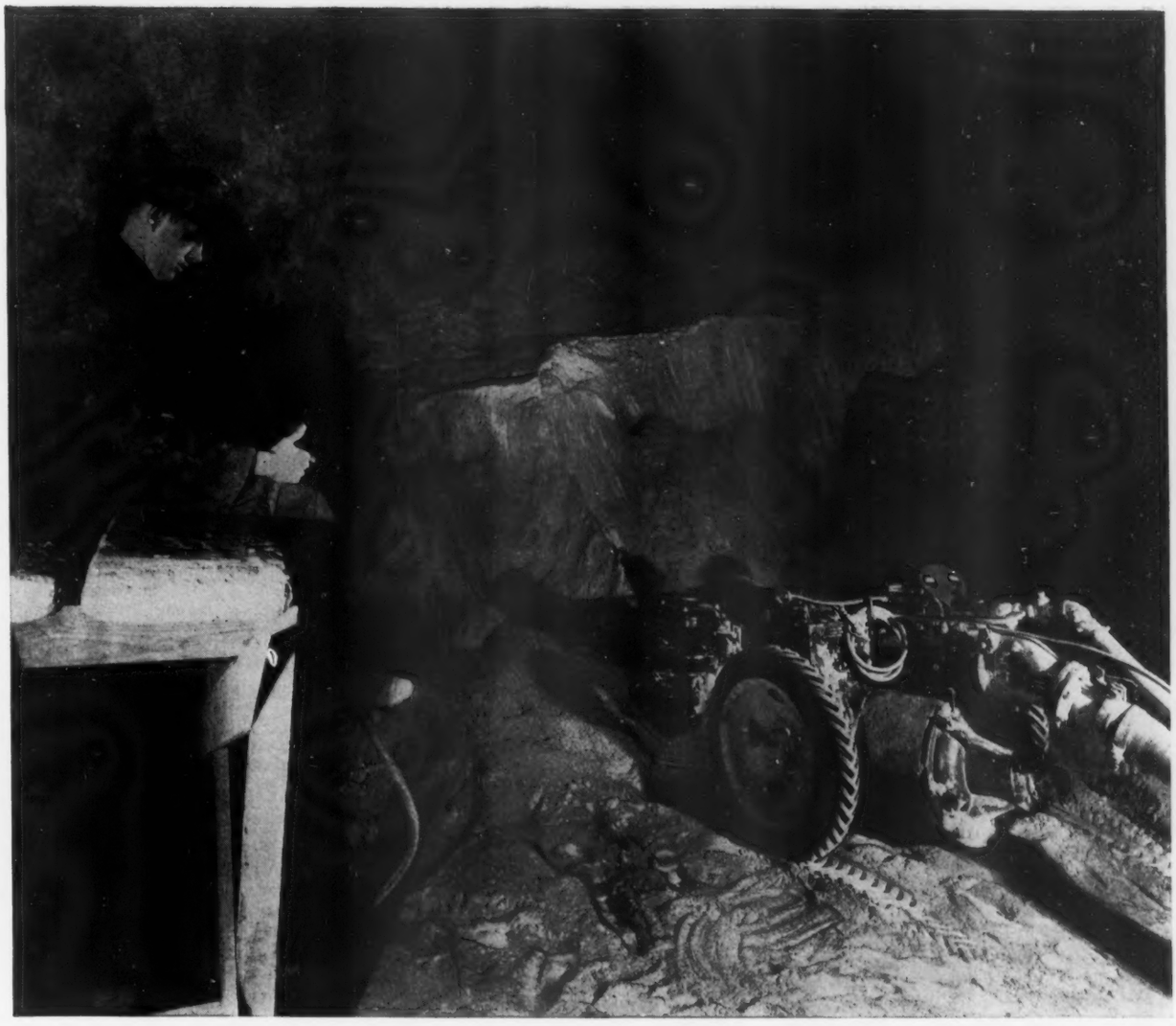

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Goodrich

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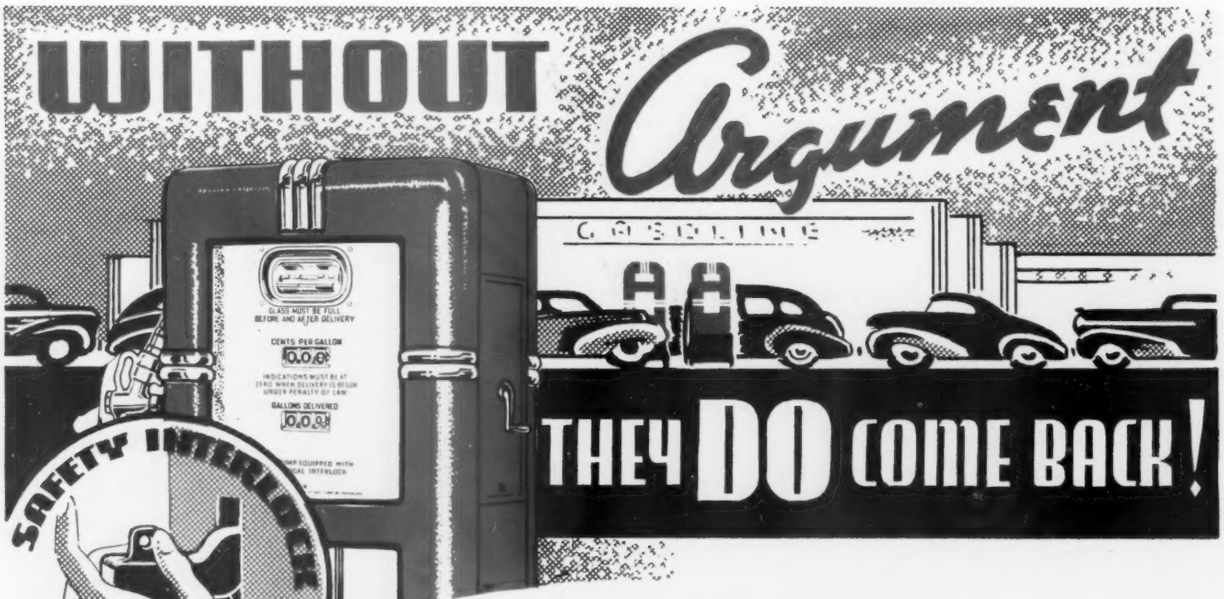

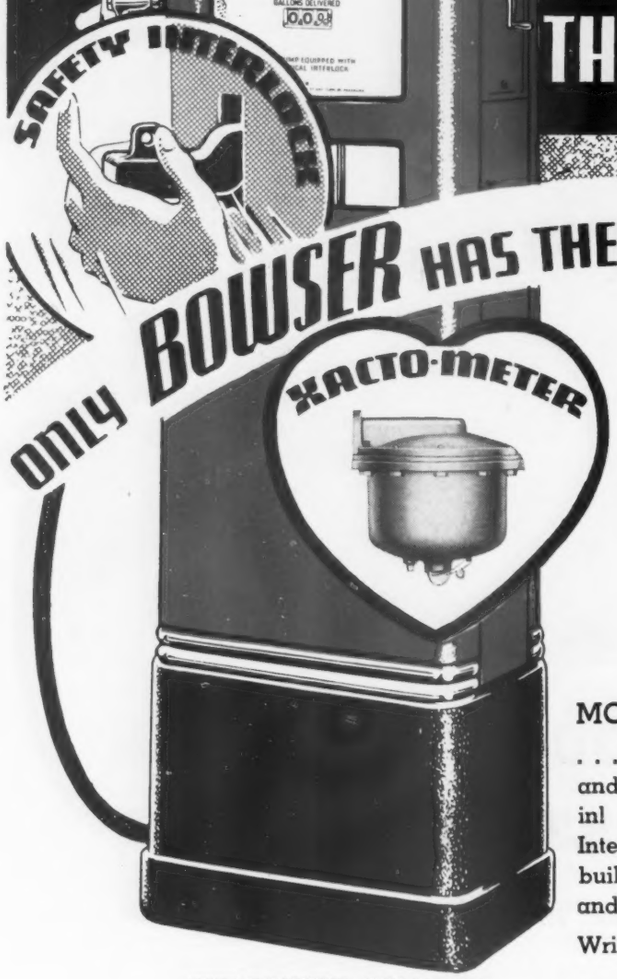

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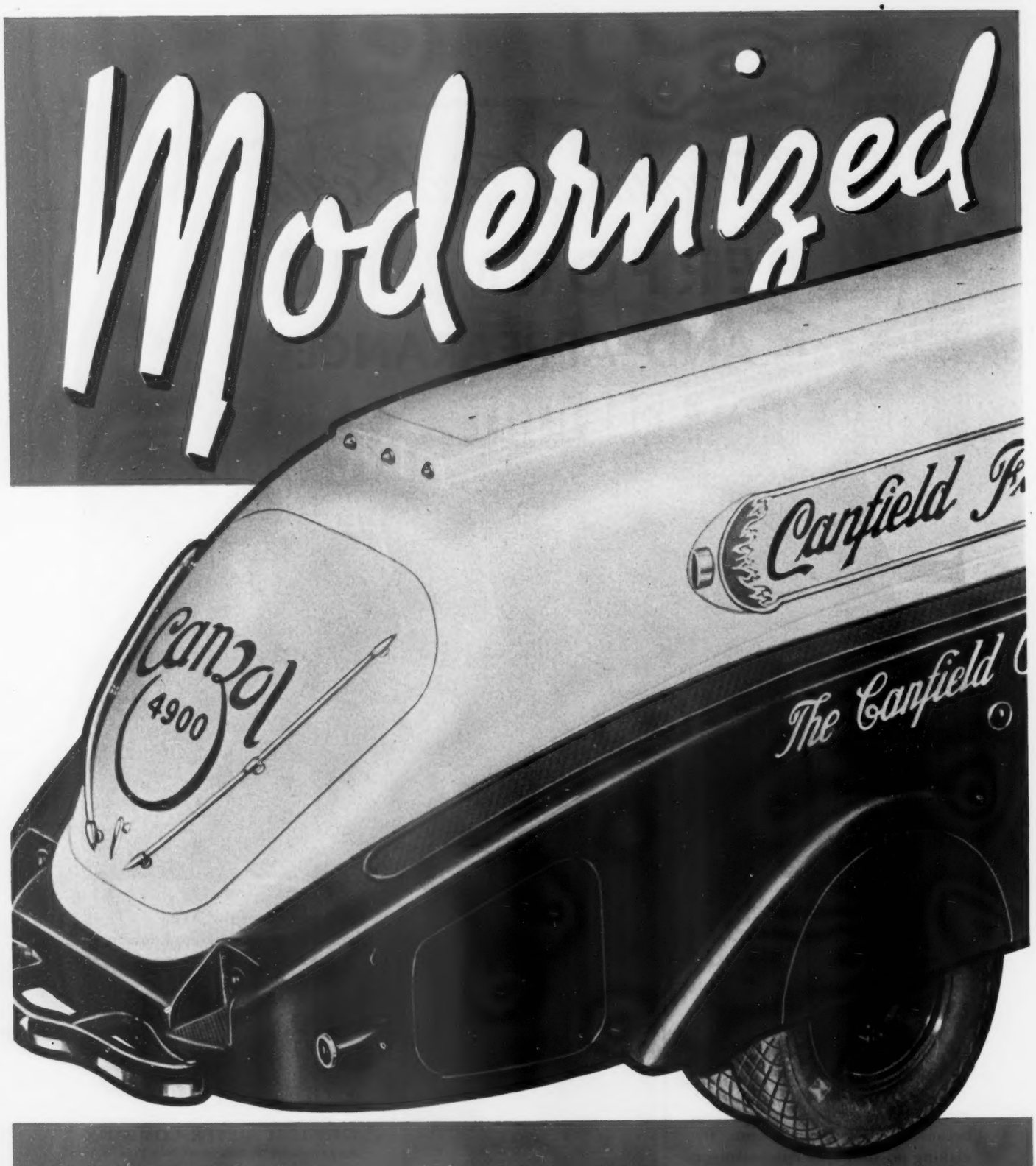

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J. J. CONRY

● J. J. (Jack) Conry is the new president of Carter Oil Co., succeeding C. H. Lieb, who has been made an officer and director of several producing subsidiaries of the Standard Oil Co. of New Jersey, and has moved from Tulsa to New York.

Mr. Conry has had 38 years of service with Standard, of which 20 has been with Carter. He started with the Buckeye Pipe Line Co. at Cygnet, O. as gauger and telegrapher. He came to the Mid-Continent with the Prairie Oil & Gas Co., went to Roumania as assistant field superintendent in 1910 and remained there seven years. He became a director of the Carter in 1932 and has been executive vice-president for about two years.

WS

LAST MINUTE
OIL NEWS SECTION

News By Teletype From 4 News Bureaus

National Petroleum News

News From Oil Industry Everywhere

VOLUME 29 WEDNESDAY, DECEMBER 29, 1937 NUMBER 52

PAB-Arnott Clash Related by Frey At Madison Trial

By Teletype
By E. L. BARRINGER
N. P. N. Staff Writer

MADISON, Wis., Dec. 28. — Completion of the examination of Dr. John W. Frey, former member of the Petroleum Administrative Board, and the calling of two new defense witnesses marked the resumption of the oil conspiracy trial in Federal Court here today after the holiday recess.

Today's session was noted for repeated clashes between counsel. Judge Patrick T. Stone, near the end of the session, noted that the trial took on a different aspect and called for an end of counsel shouting at each other.

Examination of Dr. Frey proceeded from objection to objection. Only on infrequent occasions was the witness able to answer consecutive questions without objections being entered. Another clash came with the new witnesses and questions concerning efforts of Pennsylvania refiners and producers toward stabilization.

New witnesses were Stuart M. Vockel of Pittsburgh, president of the Waverly Oil Works, and W. G. Brundred of Oil City, independent producer and director of the Pennsylvania Grade Crude Oil Assn. Both were on the stand only a short time.

After identification Vockel left the stand following objections by government counsel to a question concerning making contact with the PAB in 1935. Brundred then took the stand. Chief Defense Counsel Donovan asked about imparting information to the PAB concerning Pennsylvania conditions.

Proof Is Offered

The jury was withdrawn and Donovan made offers of proof relating to testimony that could be given by Vockel, Brundred, and Frey on letters and telegrams and meetings with the PAB in May, 1935, regarding Pennsylvania benefitting from stabilization in the Mid-Continent.

The court sustained objections of government counsel to offers of proof.

Donovan introduced as evidence the Interior Department's press release of May 7, 1935, on the Blazer committee report, which was a survey on how the NRA code was affecting small oil companies. Objections were sustained on introduction of papers related to the Blazer report, also to the full report.

Frey, on cross-examination Dec. 28, related how the PAB April 22, 1935, wrote to Arnott imposing three conditions on general stabilization work and relating to complaints about moratoriums, stabilization committee representation and secret committee meetings.

The stabilization committee came to Washington for the May 8 meeting, said Frey, to

(*Continued on page* 21)

Oil Industry Promised Larger Markets In '38

N. P. N. News Bureau

CLEVELAND, Dec. 27. — The oil industry enters 1938 with a continuance of stable conditions in its producing operations assured and with larger markets estimated for its principal products.

State officials in the producing area in the southwest say that the conservation policies now in effect in those states have made 1937 a successful year for the oil companies there and have also achieved stability for the oil industry in general.

Estimates of various authorities as to gasoline demand in this country in 1938 all provide for an increase over 1937 consumption — which in itself is by far the highest on record.

These estimates for 1938 vary from an increase of 3.5 per cent to 5 per cent based on present business conditions and increasing as general business improves.

Demand for light fuel oils in 1938, principally for heating purposes, will be from 10 to 15 per cent higher than in 1937, these same authorities say.

The demand of the public on the oil industry for greater quantities of improved products continues to make its expansion imperative, stated W. S. Farish, president of the Standard Oil Co. (New Jersey) in a year end review.

"Expansion Imperative"

"All through the depression the industry has continued to increase investment and to engage in new construction," Farish stated. "The year just ended has witnessed greatly increased operating and capital expenditures. The demand for greater quantities of products of improved quality has made this expansion imperative and the end is not yet."

Expenditures by oil companies for plants and equipment in 1938 will run at least several hundred millions of dollars, according to a recent check by NATIONAL PETROLEUM NEWS.

Preliminary estimates from the refining branch of the oil industry are that from $250,000,000 to $300,000,000 will be expended in 1938 in new building and modernization and maintenance of operating equipment.

It is estimated, on the basis of a recent check among local

(*Continued on page* 10)

Court Of Appeals Upholds Lewis Patent On Refining

N. P. N. News Bureau
By ARCH L. FOSTER,
Technical Editor

CLEVELAND, Dec. 27.—The Lewis patent on fractional distillation (No. 1,680,421), was adjudged to be valid and infringed, by a three-judge court in the Third Circuit Court of Appeals for Pennsylvania, Philadelphia, in an opinion handed down by J. Buffington, presiding judge of the court on Dec. 21.

This patent, owned by Atlantic Refining Co. was in suit in an action against James B. Berry Sons Co., with a refinery operating at Oil City, Pa.

This opinion reverses in part the decision of the judge of the District Court for Western Pennsylvania, at Pittsburgh, last year, in which this patent was adjudged infringed but invalid for want of novelty, etc. The case is a companion case to that of Standard Oil Development Co. against the Berry company, also tried in the same district and circuit courts, both of which found for the defendant, invalidating the Standard patents, Loomis No. 1,756,032, and Loomis and Lewis No. 1,746,198.

The circuit court decision directs that the case "be remanded to the court with instructions to reinstate the bill, enter a decree of infringement and accounting". Earlier the decision says: "We hold the claims in suit valid. That they were infringed was a fact found by the trial court and we find no error in the court so finding."

Claims Involved

The claims involved in the Lewis patent were not for an apparatus, as indicated in the lower court's opinion, but for a process which the inventor showed could be used in the apparatus shown in the trial, the circuit opinion stated. These claims are, 1 and 2:

"1. In the art of fractionally distilling hydrocarbon oils, the method which comprises passing vapors of the oil counter current to and in contact with

(*Continued on page* 17)

Forecasts Higher Gasoline Sales In '38 Than '37

N. P. N. News Bureau

CLEVELAND, Dec. 28.—Domestic gasoline demand in 1938 will top 1937 from 3.5 per cent to five per cent, a check among customary sources of oil statistics indicated today.

None of the sources cared to make an official prediction, but an average of predictions by oil company statisticians at their meeting during the American Petroleum Institute convention in Chicago last month indicated a five per cent increase in gasoline demand in 1938 over 1937.

In line with this composite prediction, it is interesting to note that the Bureau of Mines forecast of January 1938 demand is five per cent above normal January, 1937. January's increase is not necessarily indicative of the entire year, however.

Three and one-half per cent increase in 1938 represented an opinion of an economist who sought to play safe, five per cent represented an opinion of those who would hazard a probable increase. These percentages are not large increases, but the increasing trend is significant in view of the estimated eight per cent increase in 1937 over 1936; the 10 per cent increase in consumption of 1936 over 1935, and the 6.3 per cent increase in 1935 over 1934.

The Current Year

The first quarter of 1937 showed a big increase over the corresponding 1936 quarter, a check of published figures revealed, but the increase was somewhat smaller during the spring and through June, 1937. Had the last six months of 1937 continued like the first six months, the year 1937 would have ended with a gain of at least 10 per cent. But demand did not register the increase expected in July and fell below expectations for succeeding months of 1937.

Domestic gasoline demand in 1937 will total about 520,000,000 barrels, which would be about eight per cent above the 481,606,000 barrels of 1936.

Gasoline exports in 1937 will run to nearly 40,000,000 barrels as compared with 28,646,000 barrels in 1936, a gain of about 40 per cent for 1937 over 1936.

If export demand is added to domestic demand, then total gasoline demand for 1937 will run to about 560,000,000 barrels, an increase of 9.6 per cent over 1936, when it was 510,252,000 barrels, it is reported.

Furnace Oils

Domestic demand for gas oil and distillates, made up of about 75 per cent of home heating oils, in 1937 will run about 16 per cent above 1936—this is based on 10 months of each year and when later figures are in the increase may be 15-20 per cent.

A conservative estimate of the increase for 1938 would be 10-15 per cent. The domestic demand for residual fuel oils for 1937 will be about 7 per cent higher than in 1936.

One for Technologists

This relatively greater increase expected in heating oil consumption over the increase expected in gasoline consumption was corroborated by another economist who pointed to the apparent inference: that the oil industry must learn how to revise the yield of products from crude oil.

"It seems the industry," he said, "must learn how to revise the yield of products from crude oil, particularly gasoline and furnace oil relationships, while at the same time producing specification gasoline to supply the ever increasing production of high compression automobile engines."

This relationship is also affected by potential excessive gasoline stocks. One source said 80 million barrels storage on March 31, 1938, would be acceptable, but probable stocks would be 90 million barrels.

Larger Markets Seen for 1938

(*Continued from page* 9)

oil jobbing companies, that close to $100,000,000 will be spent by this important group of oil companies over the country in plant modernization and for such new equipment as gasoline pumps, automobile lifts, trucks and so on.

The efforts of the railroads looking toward increased freight rates on petroleum products as well as other commodities have already stimulated the building of gasoline pipelines.

Higher railroad freight rates will increase this use, it is believed by oil companies.

The effect which the oil conservation and proration program in the producing states has had in bringing about stable conditions in the production of crude, which has also brought stability to the industry in general, is set forth in statements from officials of the producing states made to National Petroleum News.

Col. Ernest O. Thompson, member of the Texas Railroad Commission, and chairman of the Interstate Oil Compact Commission, said that the accomplishment of sane conservation and proration methods had made it possible for the oil companies to make "almost peak profits in 1937."

Kansas is closing the best year in the oil industry it has ever known and it is the opinion of the chairman of its corporation commission that the year 1938 will exceed 1937. The oil industry in Oklahoma will start 1938 in excellent condition, said Gov. E. W. Marland.

The statements from these officials in the oil producing states and articles giving details of the oil industry's estimated markets for 1938 and of its expenditures in the coming year are to be found on the following pages of this issue.

$100,000,000 In Modernization In Marketing Planned For '38

N. P. N. News Bureau

CLEVELAND, Dec. 27.—Local oil jobbing companies in the U. S. will spend around $100,000,000 in 1938 for modernizing and building new service stations and bulk plants and the purchase of trucks and other equipment, not including inventories, a recent check by National Petroleum News indicates.

However, this volume of purchases, as huge as it appears, is but a small part of the total outlay the oil industry will make in the coming year. Four major oil companies, whose spending plans were made known to N. P. N., expect to spend in the aggregate $87,600,000, including their production, refining, pipeline and marketing branches.

Of these four companies, one concern, it is known, will spend over $25,000,000 in 1938 in replacement and expansion items. Last year its expenditures were about 25 per cent higher. This company's estimates of its expenditures in the marketing branch of the industry alone are over $5,000,000.

Another major company estimates it will spend $15,000,000 in 1938 but it is not able to break this down for the various divisions of the industry as yet. Last year this same company spent a little under $15,000,000.

Another major company places its expenditures for the coming year at over $38,000,000. One large company was not able yet to gauge its 1938 expenditures but it believes they will be larger than in 1937.

Other large oil companies, while not able to give a complete estimate as to their expenditures, reported on some phases of their 1938 replacement and plant modernization programs. One company said its expenditures in its refining division would run in excess of $500,000; another is spending $3,000,000 in its refining department and for a pipeline. Another company is already committed to $1,800,000 in refinery construction.

$5,000,000 Gasoline Line

The Shell Petroleum Corp., of St. Louis, recently announced it is spending $5,000,000 now in constructing a gasoline pipeline from its Wood River, Mo., refinery to Toledo, O. A group of four refining companies in the Mid-Continent are contemplating a joint gasoline pipeline to cost in the neighborhood of $12,000,000. It is considered certain that the granting to the railroads of further increases in freight rates on petroleum products will mean expansion of gasoline pipelines as, under even the present level of rail rates, growing use has been made the past few years of this means of transportation for gasoline.

Expenditures by local oil jobbing companies, it is indicated, will range as high as $100,000 by individual companies. Purchases will range from a single meter or pump to completely-equipped marine terminals; from one truck to fleets of 20 or more trucks and trailers. Average expenditures for the individual company will run about $10,000, it is indicated.

The recent check of oil marketers' plans made by National Petroleum News indicates that, even with business conditions as they are today, about 85 out of every 100 jobbers in the country are planning to spend something besides ordinary outlays for inventories in the next twelve months. And among the remaining 15 there are some who will go ahead with their spending program if business conditions improve.

Of the "spending jobbers", 75 per cent are planning to build new stations or bulk plants, install additional tankage, new pumps or meters, or otherwise expand or modernize those facilities—and their average expenditure for this purpose will be about $9500, they report.

Here is a jobber in the south-

west who itemizes his expansion plans, as follows: Gasoline pumps, $5000; lifts and greasing equipment, $4000; meters for bulk plants and/or trucks, $1400; 6 to 10 trucks, $10,000; service station tanks, painting and other items, $15,000; and modernization, including "enlarging and meters", $5000.

A Michigan jobber is planning a new marine terminal while another from the same state reports he will build three new stations in the coming year.

From a Rocky Mountain state comes a jobber's list of expenditures totaling $20,250. Heading the list is $7000 for gasoline pumps. His other items are: lifts and greasing equipment, $500; meters, $750; trucks and trailers, $2000; modernization and other items, $10,000.

There is a jobber in the south who doesn't itemize his expenditures but reports plans to spend $50,000 "on pump and tank equipment, and remodeling of stations and bulk plants," while another jobber in the same section of the country lists $48,000 "for operating equipment."

Another southern jobber writes in about expansion plans amounting to $74,000; a large chunk of this for new stations, but there are also items of $10,000 for more tanks and larger lines, $5000 for trucks and trailers, and $2500 for lifts and greasing equipment.

Approximately 68 per cent of the "spending jobbers" reporting to NATIONAL PETROLEUM NEWS are planning to spend varying amounts on trucks and trailers.

A jobber in the west expects to buy 20 trucks, another eastern jobber lists $30,000-$40,000 for trucks, while still another in the south reports $20,000 for rebuilding and buying new trucks and trailers.

The average expenditure of the companies reporting as planning to buy trucks and trailers, however, is $3300 each.

Gasoline pumps is the most-frequently mentioned item, with prospective purchases by a single jobber running as high as $15,000 and numerous instances falling within the $5000-$10,000 range.

Besides the items for modernizing and expanding existing service stations and bulk plants, many jobbers told of plans to build new stations and bulk plants. Estimated costs for a proposed station ranged as high as $45,000 for a "super" in New England.

Every variety and type of equipment is represented in these jobbers' expansion plans. For example, a Michigan jobber lists $1000 for tiling the floors and walls of rest rooms; a Virginia jobber, $30,000 for new tanks, pumps, piping and building; a Maryland jobber $15,000 for all-steel stations.

Refining Branch To Spend in '38 Over 300 Million

N. P. N. News Bureau

CLEVELAND, Dec. 27.—Preliminary estimates of budgets and appropriations for 1938 indicate that refining companies in this country during 1938 will spend probably $240,000,000 to $300,000,000 on refining department equipment. This budget will include new building, rebuilding and modernizing of existing units, and maintenance of operating equipment in general.

Too early to subdivide this estimate into amounts which may be spent for each purpose, countrywide indications are that maintenance and rebuilding will require a greater percentage of the total equipment bill of the refining industry than it did in 1937.

The number of cracking units which are in sight now does not appear to exceed a dozen, the greater part of which will be replacements for older uneconomic units. Because of the shift of location of major crude supplies during the last few years, refineries now advantageously located with respect to crude, water transportation, and large consuming centers may be expected to increase cracking capacities slightly.

The changing economic structure, especially geographically, has already closed down at least five refineries which could not compete in the new situation. Most of these are scheduled for, or are on their way piecemeal to the scrapheap or possibly as raw material for heavy ordnance.

In descending order of amounts spent for new and replacement or maintenance equipment, distillation and cracking stills will probably take first place. Cracking temperatures and pressures are becoming higher, increasing the rate of wear of equipment. Salt and corrosion problems are increasing, also shortening the life of equipment and demanding more expensive metals. The same problem is requiring installation of special units, or chemical treating methods to reduce the corrosion of equipment.

Towers and fractionating equipment will doubtless be modernized to a considerable degree, with treating and processing equipment to continue its steady and rapid increase of the last two or three years. Chemical treatment has received new impetus by the commercialization of new light oil and gas treating processes, of which a half-dozen processes have been offered the industry in recent years. Solvent extraction of heavy oils has been in the doldrums for some time, so far as new units are concerned, but may revive somewhat as more exact knowledge is obtained of how to utilize this principle.

No very clear estimate of the expansion of polymerization capacity may be made now. Probably a dozen new units are seriously contemplated by different refiners; the closing of contracts is a different matter for several reasons, one of these being the possibility of some radically new development by the research organizations which has made some refiners hesitate to take on a process now which may become obsolete in a short time.

MUSKEGON, Mich., Dec. 27.—John M. Thune has been elected vice-president of the Service Station Equipment Co. Thune has been in charge of sales for the company since the death of the late Harry E. Fuller, earlier this year.

More on Oil Industry's 1938 Plans

• Other articles carried on later pages of this issue give still more detail on the oil industry's prospects for the coming year.

An article on the growing use of pipelines to transport gasoline from refineries appears on page 18.

Statements from officials of producing states on the effect their conservation and proration programs have had in maintaining stability in the oil industry are carried on page 19.

Faced with a growing demand for products of continually improving quality, the oil industry has not yet reached the end of its expansion, says W. S. Farish, president of the Standard Oil Co., (New Jersey) in a year-end statement carried in full on page 21.

Shell Gasoline Line To Extend Into Toledo, O.

ST. LOUIS, Dec. 27. — Shell Petroleum Corp. officials said today that the 241-mile gasoline pipeline now under construction between its Wood River (Mo.) refinery and Indianapolis will be extended to Toledo, a total distance of 350 miles.

A spur will run from Lima, O., to Columbus, in the center of Ohio, a distance of 67 miles.

The project will cost $5,000,000, Shell officials said. Toledo is a big refinery center where four of Shell's big competitors now operate plants. They are Gulf Refining Co., Standard Oil Co. (Ohio), Sun Oil Co. and Pure Oil Co.

Since Toledo is located on Lake Erie, Shell may ship via barge or tanker to other Great Lakes cities direct from the Toledo pipeline terminus. At present Shell ships via the lakes from Chicago, but this is not possible in the winter time. While shipments out of Toledo are not possible the year round, the lower lakes open sooner to navigation than the Straits of Mackinac, passage from Lake Michigan to Lake Huron.

The new gasoline pipeline will provide Shell with an immediate outlet to the highly competitive Michigan territory. It will also feed the Indiana market, where Shell has heavy distribution. At present all gasoline from Wood River into Indianapolis moves by tank car. A maximum of 25,000 barrels of gasoline daily can be moved through the line when completed.

The line will be 8-inch to Indianapolis and 6-inch to Toledo. The Lima-Columbus spur will also be a 6-inch line. The line will be electrically welded.

Route of the main line will be via Terra Haute, Indianapolis, Lima and Toledo. Take off points will be at Effingham, Ill., Terra Haute, Muncie, Ind., and the three Ohio cities—Lima, Toledo and Columbus. Three electric pumping stations will power the line.

While most gasoline lines in the same geographical area are from three to near four feet below the surface of the ground, Shell's new line will be in a full four-foot ditch to provide ample protection, Shell officials said, from tampering and frost.

Construction of this line is the largest of five major gasoline pipeline projects begun or completed in 1937 and confirmed the trend toward greater pipeline movement of refined products.

Jobbers Fight Rate Boost; Fear Pipeline Competition

By Teletype
N. P. N. News Bureau

CHICAGO, Dec. 28.—Stating that the independent oil jobber would be hit harder than the major company, four officers of midwestern petroleum associations joined today in expressing opposition to the proposed 15 per cent freight rate increase sought by the railroads.

Truck transporters in Nebraska, however, favor the rate advance on grounds that increased insurance costs make a rate advance imperative, and that other prices would advance accordingly.

In asserting that the independent would suffer a competitive disadvantage in event of the proposed increase, G. A. Primm of Springfield, Ill., secretary of the Illinois Petroleum Marketers Assn., said:

"We are opposed to the increase as it would increase the freight rate to jobbers unfairly in relation to competition from major companies who already have gasoline pipelines."

Primm pointed out that in making a market price based on operating costs that pipeline costs are a big item in arriving at the cost of operations.

"A freight rate advance would be a reduction in the jobber's margin," he continued, "if major companies do not pass on the higher freight rates to the public.

"The rate advance will force jobbers to use marine and truck transportation and reduce railroad tonnage," Primm commented.

Illinois jobbers have been leasing river terminals, Primm observed, and the only stumbling block to marine developments is the jobber's inability to buy gasoline in the south.

Holding the Bag

The new rates would increase in transportation costs of from $27 to $33 a car for Wisconsin jobbers, said Roy L. Brecke of Milwaukee, executive secretary of the Wisconsin Petroleum Assn. His comment follows:

"The Wisconsin Petroleum Assn. through action of its board of directors, filed Complaint No. 27907 with the Interstate Commerce Commission some time ago attacking the estimated weight of 6.6 pounds per gallon used on gasoline. With the correction of this unfair estimated weight on gasoline moving by rail and the excessive over-charge it would mean a savings of about $15 to $20 per car on shipments on a group Three basis.

"Now we find the railroads anticipate a 15 per cent advance on petroleum products, meaning an increase in cost of $27 to $33 per car. This would mean nearly twice what would be saved under correction of the estimated weight of 6.6 pounds. The association is bitterly protesting this exorbitant and uncalled for increase at this time.

"If this advance of 15 per cent is put on it would mean the jobber will again be the goat, as the refinery does not pay the freight. It outwardly means that this price would ordinarily be put on to the consumer, but as in many cases the poor independent jobber, who is now merely making an existence, and some not making that, will again be holding the bag.

"We appreciate that the refineries are doing all they can; particularly those using railroads and not connected with the pipelines and water transportation, in spite of the fact that they will not be the ones to pay this increase. Letters of protest are being sent to all congressmen from Wisconsin as well as U. S. senators and nothing will be left undone to attempt to prevent this uncalled for and drastic increase.

"In the long run if such an increase should go into effect we anticipate refineries will be trucking gasoline into Wisconsin and it will be a detriment to the railroads if they insist at this time that such increase should be put into effect."

Indiana Comment

"The railroads have brought out only one side of the picture," said George W. Hofmayer of Indianapolis, secretary of the Indiana Independent Petroleum Assn. "Their claims that earnings per ton mile have decreased 20 per cent during the period 1921 to 1936 is all very good; but they have failed to show that costs per ton mile have decreased 40 per cent during the same period.

"In reality the railroads are in no worse condition than the petroleum and other industries who will have to foot the bill."

"We are opposed to it at this time as pertaining to the oil industry," said Elwin E. Hadlick of Minneapolis, president of the Northwest Petroleum Association. "The industry already is bearing too big a share of the transportation burden."

Comment from C. M. Sutherland & Sons of Lincoln, Neb., shows the truck transporters in favor of a rate advance.

"The United Transporters of Petroleum Products, representing nearly 500 pieces of equipment and hauling over 50 per cent of the petroleum products imported into Nebraska, will support the proposed 15 per cent rate advance," the Sutherland representative commented.

"Rates on public liability and property damage insurance are increasing greatly, together with other over the road costs, which makes increase in revenue for hauling imperative."

Truck transport rates in Nebraska, where products are hauled in from Kansas refineries, have been about 92 per cent of the railroad rate.

The general retail, and wholesale, price structure in the middle west has long been based on railroad rates, regardless of whether the product moved to market from a refinery by marine or truck transport.

Last Reminder!

THIS is the LAST reminder to you about the coming "1938 New Car Lubrication Issue" of NATIONAL PETROLEUM NEWS, which will be off the press on January 12th.

The presses start rolling on this issue January 3. Unless we have your order for extra copies before this date, you run the risk of being disappointed. We must have the press-run ready for our printers on January 3.

So, if you want to make sure of getting extra copies of this annual number, which last year was a complete sell-out and we had to turn down orders that came late—

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Builds Bulk Plant

PHILADELPHIA, Dec. 27.—George Senn, of Philadelphia, has just completed construction of a bulk plant for storage and tank wagon delivery of benzol, xylol, toluol and special naphthas. The company has also installed facilities for the tank wagon delivery of turpentine. It is extending this service to the trade in greater Philadelphia, which it has been servicing for over 21 years.

25th Anniversay for Gas Assn.

NEW YORK, Dec. 24.—The Compressed Gas Manufacturers' Assn. will hold its Silver Jubilee meeting at the Waldorf Astoria, New York, Jan. 17-18. The formal program is to be announced later. Liquefied petroleum gases are one type of gas which the association deals with. Ammonia, sulfur dioxide, acetylene, carbon dioxide, and oxygen are some of the others.

Six Regulation and Tax Measures Affecting Oil Before '38 Congress

N. P. N. News Bureau
By G. T. KELLOGG

WASHINGTON, Dec. 27.—Congress, which adjourned its special session last week with virtually no legislation to its credit — certainly none of the laws for which President Roosevelt called the session together —will open its 1938 stand here next week.

On the 1938 docket are measures affecting stream pollution, corporate surplus tax, depletion allowance, marketing divorcement, pipeline divorcement and price fixing. The oil industry is directly concerned with all six of these matters.

How much more successful the administration will be in pushing through its measures at the regular session is difficult of prediction.

But aside from the administration's program, there still are several measures affecting the oil industry directly or indirectly pending before the Congress — hangovers either from the last regular session, which quit in August, or from the extraordinary (in more ways than one) session ending Dec. 21.

Pollution Bill in Conference

High up on the list is pollution. During the spring of 1937 several pollution bills were introduced in both houses. The House passed the Vinson bill, a "study" type of bill, relying on state action and federal co-operation.

But the Senate took this measure, which had not met with a great deal of opposition in its passage through the lower house, and tacked onto it the so-called Lonergan amendments, radically changing it into a stringent federal control and policing measure, authorizing federal standards of purity and providing for injunction actions by U. S. attorneys if the federal standards set for any stream in the country are not upheld.

The House, however, would not agree to these amendments, and the bill was sent to conference. Conferees were unable to reach a compromise bill, and their report was delayed until the coming regular session in January. Conferees include Senators Copeland, N. Y.; Caraway, Ark.; Guffey, Pa.; Clark, Mo., and White, Me., and Representatives Mansfield, Tex.; DeRouen, La.; Gavagan, N. Y.; Seger, N. J., and Carter, Calif.

Surplus Tax

The report of the Vinson tax subcommittee, and subsequent action by the ways and means committee on a bill revising the tax structure also is of importance to the oil industry as well as business generally.

It is virtually certain that some form of relief from the much-criticized undistributed corporate profits tax will be recommended, and probably passed. There are a dozen or more bills before Congress concerning this tax, ranging from outright repeal to slight modification and percentage allowances, but the ways and means committee's recommendation will not be made until after the regular session begins.

Also included in the tax bill is expected to be provision for repeal of the so-called "Ickes taxes" on production and processing of crude oil. These taxes were passed in 1933 as regulatory, rather than revenue taxes.

Depletion Allowance

The oil and mining industries are expected to make a determined stand against any proposal which may appear in the tax bill to decrease or eliminate the depletion allowance granted in computing income taxes of corporations in these industries. The depletion allowance was termed a "tax loop-hole" by Treasury Secretary Morgenthau in his now famous "loop-hole" letter to the President, which the latter passed along to Congress in asking for tax revision.

Divorce Bills

Companion bills introduced by Senator Gillette and Representative Biermann, both of Iowa, providing for divorcement of major oil companies from marketing of their products are expected to be pushed by their authors at the coming session. The National Oil Marketers Assn. has placed its stamp of approval on the proposal, as have several state jobber organizations.

Another bill introduced at the last session which has received approval of jobber associations is the Borah proposal for divorcement of pipeline operation from other branches of the industry.

What is to be expected from other regulatory proposals, affecting all industry, is as uncertain as a bet on what kind of weather we'll have come next Michaelmas. The temper of Congress was demonstrated in its recommittal of the wage-hour bill, and it may be that some of the other drastic regulatory proposals may come to an equally final end.

Senators Borah, Idaho, and O'Mahoney, Wyoming, believe their federal corporation licensing measure will cure all the ills of industry, but it is still in the committee on judiciary. Several other regulatory measures also wait in committees for action.

The government already has wrapped its regulatory arms around the bituminous coal industry, and only a few days ago announced its "schedule of fixed minimum prices for coal loaded in trucks or wagons at the mines of code members". However, a Senate resolution to investigate activities of the commission is being considered by a special Senate subcommittee.

The petroleum industry is naturally showing a measure of interest in administration of the coal act, and the government's attempts to set the price of coal at the mouth of almost every bituminous mine in the country.

If these minimum prices set by the commission actually increase the consumer cost of coal, they may be expected to enlarge the market for competing fuels. Officials of the commission, however, declare that in many cases the minimum levels set by them will bring about a reduction in consumer cost. The price schedules issued by the commission are complicated tabulations.

Road Funds Not Cut

Only one "still small voice" was heard during the special session backing President Roosevelt's recommendation that federal-aid highway funds be slashed. A bill was introduced by Representative Bacon, New York Republican, but not acted on. Under the present law, Agriculture Secretary Wallace must make apportionment to the states of $214,000,000, already authorized for the coming fiscal year, before Dec. 31.

Little support is foreseen for any proposal to cut federal aid for highways.

A fight to repeal the Tydings-Miller law, which President Roosevelt called a "price-fixing" measure before he reluctantly signed it last spring, is being organized by the National Grange. The T-M law backstops state laws providing for resale price maintenance contracts.

Agree to Back Repeal of 'Regulatory' Tax

N. P. N. News Bureau

WASHINGTON, Dec. 28.—Before disbanding until the regular session of Congress, the special House ways and means sub-committee studying tax revision tentatively agreed to recommend repeal of the so-called Ickes taxes on crude oil production and processing.

The taxes, which levy one-tenth of a cent per barrel on "crude petroleum sold by the producer" and a like tax on "crude petroleum refined or processed in the U. S." and "gasoline produced and recovered in the U. S. from natural gas."

They were originally passed in the Revenue Act of 1934 as "regulatory taxes" to aid in enforcement of federal oil conservation laws, according to ways and means committee attaches. They were never called upon for this purpose, however, the Petroleum Conservation Division, Interior Department, said.

Jailed For Contempt

AUSTIN, Texas, Dec. 24.—C. W. Curtis, receiver for Clay Refinery, Arp, and Tower Refinery, Overton, both East Texas plants, was sent to jail by District Judge J. D. Moore Dec. 21 for contempt. It was charged Curtis had failed to comply with a previous order of the court to bring in records of the two companies involved in a $250,000 penalty suit by the state alleging violation of the Texas Railroad Commission rules.

The contempt order directed that Curtis be confined until he complied with the first order.

Okla. Chapter Meets

N. P. N. News Bureau

TULSA, Dec. 27.—The Northeastern Oklahoma chapter of the American Petroleum Institute, production division, will meet in Bartlesville, Jan. 12, F. W. Floyd, chairman, has announced. The plant of the Reda Pump Co. will be visited and a tour made of the new U. S. Bureau of Mines building. In the evening the Doherty Men's Fraternity glee club will entertain, a Bureau of Mines picture of the Mexican oil fields will be shown and L. R. Hodell, Carter Oil Co., will speak on welding of casing.

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Why Not State Control For Pickles, Shoes, Lawyers?

By WARREN C. PLATT, Editor

Probably the best place for the oil industry to start, in determining its position toward the activities of the various state oil investigation committees that met in national conference at Chicago last week, is—

That there is no more justification for any control or regulation of the oil industry's distribution of its products by government than there is justification for similar control of every other business and industry and profession.

If there are too many gasoline outlets then how about drug stores, grocery stores, restaurants and all types of retail stores, to say nothing about all the doctors and dentists whose professions are notoriously overcrowded? And last how about all the lawyers?

If gasoline stations should be licensed for their "economic necessity" or other reason then why not all the other retailers and professional men?

If gasoline needs grading then how about grading all food products, clothing, shoes and even hats and all other articles used by this country? Also why not a board to give frequent examinations to professional men—especially the lawyers—and in their gradings take into account their personal conduct?

As to gasoline prices—the chief time the consuming public should concern itself with prices is in the event of a monopoly in gasoline manufacture and distribution existing or even being suspected, when the monopoly should be attacked under existing anti-trust laws. Certainly all will agree that no such monopoly exists today?

In the absence of a monopoly on gasoline prices, what justification is there, under what we have always considered the American system of government, for regulating gasoline prices? Is there any more need for regulating those prices than the prices of every other commodity that the public buys, or the prices of the services of the doctors and lawyers the public hires? We point particularly to the lawyers because they are generally most active in these extra-legal legislative ventures.

If all the foregoing legislation should be visited upon the oil industry then is not there equal justification for its being imposed on every other kind of business? If we are going to have government regulation and control of any single industry in this country that by its nature does not use a franchise, then fair play would say have it for all industry, which would put this country right where Russia, Italy and Germany are today.

The history of all political incursions into the daily lives of the people, whether their personal lives or their business lives, is to push for greater and greater authority and control. People, no matter who they are, like to exercise authority over others. Few people in this world, if they had the opportunity probably would refuse to accept a dictatorship over all others. So we find those in public office following this natural bent and grabbing for more and more power over others. What they once grab they do not give up except after a struggle. Also once you have obtained the power it is easy enough to find reasons to justify one's conscience in keeping it, if such justification is needed.

Probably all of these business investigations—especially in the oil industry—result from complaints of competitors in that business. Probably most of the time the complaints are well justified. Probably in a great many cases the complainant business men have no idea of bringing about more government control over their businesses. Complaints are frequently weapons to bring a big competitor to his senses. Nothing else has worked, so the smaller or unfortunate competitors take their cases to a court of law or to a legislature and so to public opinion.

Such being generally the case big business—including major oil companies—should begin to set up channels for the quick reception in the president's office of all complaints in the industry before they get serious enough to bring on legislative attention. Complaints mean a maladjustment in business somewhere along the line, a faulty policy or an unintelligent carrying out of what may be a perfectly good policy. With the bigness of business today it is hard, if not at times even impossible, to get these complaints before the higher executives or to get them there in an impartial way.

Big companies have their departments of public relations and of personnel but something is still wrong, probably because these departments have not been given the authority or the staff to keep in touch with industry and the public down to the grass roots. Also probably their counsel has not been listened to with due care. However, we know that big oil men are now giving more attention to what is going on in the industry and with the general public than ever before and that they have developed departments to help carry on the right contacts. Still much yet remains to be done, else we would not have this plague of legislative investigations.

On the other hand, and a word of criticism of the smaller units in an industry, we know that they have not always used due diligence and good judgment in seeing that their complaints got to the right people in their larger competitors. Too frequently they have been satisfied with turn-downs or promises by sub-ordinate officials whom they could not help but know did not have the last say. The plea that small operators cannot get to the higher-ups does not hold much water, because any sizable group of fair representatives of an honest line of thinking in an industry should certainly be able to muster up the ability to push by the understudies and break into the big bosses' office.

Of course we are talking only about those with honest and legitimate complaints or who fairly think they have, not hi-jackers.

But now that the oil industry is confronted with all these legislative investigations, regardless of who is at fault, the industry should not give up any of its American rights and should not consent to any "sovietizing" or "communizing" regulations.

What may today look to a complaining competitor as a "righting of his wrongs" may tomorrow appear more clearly to him to be the camel shoving his nose under the tent, that he soon may attempt to enter and occupy it.

We May Discover In '38 Everybody Can't Live Off Taxes—Writes Botts

Dear Editor:

Well, here we are with another year looking us in the eye and almost before we grew accustomed to the old one. Even in my community where nothing much happens and the days sometimes are long, it seems that it was just last week that the postmaster put up the 1937 calendar. Maybe it was, at that.

It is customary at this season for the prophets and the soothsayers to burst out with predictions, mostly praising the past and deploring the future. So, craving your indulgence, I would like to join this morbid band. After making certain that my astigmatism is working properly, I predict, as follows:

1938 will be a year in which numerous people will run for office and most of them will promise everything from universal pensions to re-location of the national capitol. They will promise enough dams to submerge most of continental U. S., barring the tops of a few mountain ranges.

Very few of these promises will be performed.

The year 1938 should see the revival of the Republican party. It came out recently, saw its shadow and went back in, which means that in six weeks it will be ready to meet all comers for the rest of the year.

Nature Remains Placid

The antics of the office-seekers will have no effect upon the rainfall, the number of days of sunshine or the success of crops that are planted. Neither will the quantity of natural resources be diminished by reason of politics.

1938 should be the year in which a lot of people will rediscover that the dog that sits on a cocklebur and howls will never catch any rabbits.

1938 will see the realization on the part of many that a sound financial system, national or individual, is any system under which outgo does not exceed intake.

1938 will be a year in which new oil fields will be found but one in which predictions will be heard that no more fields will be found. At least 10,000 speeches will be made on conservation and three or four speakers will know what they are talking about.

1938 should see the usual gain in consumption of petroleum products and there will be much activity and great outlay of money in taking care of the demand. There will be numerous predictions that the demand has reached its peak.

Throughout the year the earth will continue to turn on its axis and if it doesn't this prediction won't matter anyhow. People will come and go and some will make money and others lose it. There should be a big gain in the number who believe that the more energy that is put into a job the better the chance of success and there should be some dwindling of support for the evangelist who would handicap the energetic to the pace of the sluggish. Many will discover that everybody can't live off taxes.

People will be born and people will die in 1938 and this time next year we will be getting all steamed up for another tussle, with that same faith that the turning of a calendar leaf will make a vital difference in our lives.

So keep your eye on the ball and your left arm straight and most of your 1938 shots will be in the fairway and the year will about average out with any of the others.

Happy New Year,
Ellick Botts, Consulting Pumper

States Organize For Correlating Marketing Probes

N. P. N. News Bureau

CHICAGO, Dec. 27.—Permanent organization was completed here last week of the National Conference to Investigate the Petroleum Industry, made up of representatives of state agencies whose functions include the investigation and-or regulation of oil marketing in the individual states. Delegates were present from 16 states and the federal government.

One resolution and two recommendations were adopted at the meeting here Dec. 20 and 21. The conference also went on record in favor of the principle of requiring retail outlets to post actual prices and to prohibit sales below such postings.

Assemblyman Harold B. Ehrlich, of Buffalo, chairman of the New York joint legislative committee investigating marketing, had called the meeting here. The national conference was organized at its opening and Assemblyman Ehrlich elected president.

The resolution adopted last week calls for further study of gasoline and other petroleum taxes preliminary to efforts to secure reductions in such taxes, as these levies form a large part of the consumer costs of oil products.

Uniform State Laws

One recommendation was in favor of uniform state laws regarding grading, adulteration and substitution of petroleum products, "since the business of producing, refining and marketing is a major industry in the United States."

Another recommendation was that the states pool information obtained through individual investigations to eliminate major oil problems related to the consumer.

Reports on investigations in New York, Pennsylvania and Washington are anticipated within the next year, Assemblyman Ehrlich reported, and he said another meeting of the national conference will be called soon after these reports are ready for study.

Delegates at the conference announced at conclusion of the meeting, from 16 states and the federal government, were:

Delegates Roster

Leo J. Wegmen, of Des Moines, Iowa state treasurer; Joseph L. McLaughlin, of Trenton, deputy state tax commissioner, motor vehicle division of New Jersey; State Senator Rhoda Fox Graves, of Gouverneur, N. Y.; William H. Godfrey, of Harrisburg, member of the Pennsylvania oil investigating committee.

Michael A. Connor, of Hartford, Connecticut state commissioner of motor vehicles; Samuel B. Ross, of Harrisburg, Pennsylvania investigating committee research director; State Senator Duncan T. O'Brien, of New York, vice-chairman of New York investigating committee.

Walter F. Brittan, of Great Falls, Montana; Thomas F. Shea, of Cheyenne, Wyoming deputy attorney-general; Herbert L. Shankle, of Raleigh, secretary of North Carolina investigating committee; Herne E. Robinson, of Sacramento, representing California's governor; Charles O. Wilson, of Columbus, Ohio gasoline tax division; Ralph W. Wilkins, of Columbus, member of the Ohio tax committee.

J. U. Luetscher, of Madison, state superintendent of inspection, Wisconsin; E. P. Blake, of Chicago, the Federal Trade Commission; R. P. Jones, representing Indiana; Joseph A. Baldwin, of Albion, chairman of former Michigan investigating committee.

Roy H. Cheny, of Jefferson City, Missouri oil inspector; Herbert R. Gallagher, of New York, representing the New York Interstate Committee on Operation; W. R. Wilder, of Pierre, assistant director of taxes, South Dakota; Robert Byrne, of Pierre, secretary of South Dakota tax division; William Bell, representing Illinois' governor; and W. H. Vosburgh, of Springfield, official observer of Illinois all-geological survey.

NATIONAL PETROLEUM NEWS staff writers, in its Dec. 22nd issue, covered by teletype completely the proceedings and discussion at the meeting in Chicago Dec. 20 and 21 of the conference of state agencies investigating the oil marketing industry. The accompanying is a summary article which should be read in conjunction with the current report in the last N. P. N.

900 Back to Work At Shell Refinery

ST. LOUIS, Dec. 27.—Following termination of a strike, negotiations will open Jan. 5 between Shell Petroleum Corp. and the Oil Workers International Union Local 367, C. I. O. affiliate, on wages, hours and working conditions of 900 employes at Shell's Houston refinery.

The strike was terminated Dec. 24 after Federal Conciliator Joseph Myers formulated a basis for negotiation between the Shell management and Local 367.

Shell had asked for a settlement of negotiations at the East Chicago refinery before opening discussions at Houston, while the union sought to cover several refineries in one agreement.

"We both decided to leave East Chicago out of the Houston picture," a Shell official said when asked the basis of the settlement of the Houston strike.

East Chicago negotiations are expected to be completed soon. Houston workers have presented no demands, Shell officials said, but the present contract covering workers at the refinery has expired.

California Freight Increase May Force Oil Firms To Run Own Truck Lines

N. P. N. News Bureau
By JACK WESTSMITH

LOS ANGELES, Dec. 24. — "They're killing the goose that laid the golden egg", was the pessimistic remark made by a California oil man the past week in discussing the effect of higher freight rates—both by rail and truck—on the transportation of the so-called dark group of petroleum products.

These rates, which became effective Dec. 6, were established by the California Railroad Commission in a supplemental order to its original decision in Case 4079, which prescribed rules, regulations and rates for transportation of refined petroleum products within the state.

Application of the rates to highway and rail movement of the unrefined oils was declared to be threatening the very life of the contract trucker on the west coast and likely to cause marketing companies to operate their own equipment in this movement.

One shipper said he had noted the increase, within recent weeks, of inquiry by truckers for additional business to keep their equipment now standing idle on the road. He said several of his accounts were contemplating the purchase of fast, large capacity trucks to do their own hauling.

As an indication of a possible trend in this direction toward company operation of transport equipment, one large California oil company has had in service for several months three truck and trailer units for making large volume bulk shipments of gasoline in the Los Angeles area.

Special Construction

One of these units has tanks constructed of light-weight high-strength steel to give a capacity of 2950 gallons on the truck and 3550 gallons on the trailer. Permission to build this truck as an experimental unit was given by Los Angeles city officials as a means of determining the practicability of the special steel. City specifications now in effect prescribe 3/16-inch steel, minimum, for one-compartment tanks in excess of 3000 gallon capacity.

The special job has 10 gauge, high tensile steel in the trailer tank and 12 gauge steel of the same grade in the truck tank. Longitudinal baffles and angle braces are aluminum, but cross baffles are made of the same material as the tank.

Material economy in the operation of this special unit and the two other regular-steel truck and trailer combinations is reported. Following a report of a study made on the high strength steel tanks, it is anticipated the present city specifications will be changed. Transportation departments of other large suppliers are understood to be looking into this possibility of company operation of bulk transports.

However, in the meantime, the oil company traffic men are faced with the perplexing problem of interpreting rules and regulations as laid down by the California Railroad Commission for the movement of petroleum products by commercial carriers.

For example, one ruling by the commission gave truckers the right to meet rail rates between rail points, but there was no definition of rail points. The question has now arisen as to whether the trucks can meet a combination of local rates from the point of origin to final destination and whether such combinations should include incidental charges, such as a ¾-cent per 100 pound pumping charge from rail tank car to tank truck at the rail-head point and a switching charge of 34 cents per ton.

Specific Rate Problems

Perhaps this could better be illustrated by a concrete example. Suppose it was desired to move a load of fuel or diesel oil from the Los Angeles Basin to a customer in the town of Calexico, on the Mexican border. A commercial trucker would charge on the basis of the constructive mileage from Compton, central point in the Los Angeles Basin for the purpose of such computations, to Calexico. This constructive mileage takes into account grades, curves and other factors which might hinder truck movement, and it is sometimes longer than actual mileage.

However, the constructive mileage from Compton to Calexico, as shown by C.R.C. mileage tables, is 238.5 miles. By another C.R.C. table this calls for a truck rate of 24.5 cents per 100 pounds of black oil. The rail rate from Compton to Calexico is 16 cents. There the matter ends, if the customer is on a rail spur. The trucker can meet the 16-cent price if he wishes.

However, if the customer is not on a spur track—and this particularly hits many independent distributors — a minimum truck rate of 3.5 cents per 100 pounds must be added to the rail rate for a distance up to 15 miles from the rail-head point. If the movement actually went by rail and was then transferred to a truck, an additional service charge of ¾-cent per 100 pounds would be charged for the transfer service. A similar charge would be levied if the transfer truck pumped the oil into storage at the destination.

The net result of this would be that a strict interpretation of the combination of locals rate for the rail and truck joint service would give 16 cents plus 3.5 plus .75 plus .75, or 21 cents per 100 pounds. Truckers could then elect to make this delivery at the combination rate. However, several oil companies objected to the inclusion of the transfer charge from tank car to short-haul truck. As the week closed the general attitude was against charging the customer for a transfer service not actually performed.

Another Example

To carry the example a little farther, if the customer were located 10 miles east of Calexico and not served by rail spur, the constructive mileage would be 248.5 miles, reflecting a truck rate of 26.5 cents, but the combination of local rates, exclusive of any transfer charges, would be 16 cents plus 3.5 cents (short-haul truck rate from rail-head point), or 19.5 cents per 100 pounds—the same as for a customer actually located in Calexico.

The truck and trailer would take the cheapest rate from point of origin to ultimate destination. This may be the through truck rate—based on constructive mileage — or may be combination of local rates, which is the basis upon which most suppliers were reported operating.

Perhaps further clarification of this and other problems will result from a hearing called by the California Railroad Commission Jan. 7 in Los Angeles. This is on the petition of the railroads to reopen C.R.C. cases 4079 and 4191 to determine whether or not changes should be made in rates established for transportation of petroleum products between Los Angeles Basin points and Imperial Valley points.

One traffic manager of a major oil company in Los Angeles pointed out that two factors were prompting the location of bulk facilities on rail spurs. He said all bulk plants to be built in 1938 would have rail facilities.

Reason number one was that the present interpretation of C. R.C. rulings makes it cheaper to be on rail head point, because the opportunity is presented for using either rail or truck and, if rail, there is no extra truck charge from rail head to bulk plant.

Disastrous experience in the northwest, where teamsters (truck drivers) went on strike and absolutely stopped truck and trailer movement of petroleum products to bulk plants not situated on rails, was given as the second reason for rail locations.

"Split Deliveries" Charge

Another C.R.C. ruling causing some confusion is the provision that $4.50 must be charged where split deliveries are made by truck and trailer units.

For the purpose of making charges for such shipments, one traffic man has adopted the following rule:

On split deliveries to the same town—for example a truck of gasoline and a trailer of diesel oil—a flat charge of $4.50 must be added.

On split deliveries to different destinations, each delivery is subject to the freight rate to the highest rated point plus $4.50 flat charge. For example: On a trailer of diesel to Indio and a truck of gasoline to Coachilla — Coachilla is three miles beyond Indio—it is necessary to pay the Coachilla rate based on the respective estimated weight for both truck and trailer, plus $4.50.

This has naturally brought about some complicated bookkeeping, because there is the question of whether the $4.50 split delivery charge should be split between the two loads when the split was for convenience of one customer only.

For illustration, a supplier might have an orchardist customer who wanted 2500 gallons of diesel oil and did not have capacity for more. This is a truck load, but few commercial truckers would want to haul a single load any distance, and also, the 2500 gallons would have to be charged for at a minimum rate of 3000 gallons.

To help customers out in such a situation, the supplier might take a trailer load of gasoline to a marketing station in the

same area, although the station has capacity for a full truck and trailer delivery. The truck and trailer movement permits the 2500 gallons of diesel to escape the 3000-gallon minimum.

Might Eliminate Charge

In the opinion of some traffic men a truck and trailer unit, with the capacity of each tank in excess of 3000 gallons, would not require a split delivery charge. Most trailer tanks exceed 3000 gallons and use of light weight, high strength steel, promises upward of this minimum quantity in the truck tank.

California oil men are also looking for an early decision by the California Railroad Commission on the railroads' suggestion that rates in effect on black oils several years ago, prior to drastic cuts, should be restored. The Southern Pacific suggested a return to rates on these commodities in effect July 20, 1931. The Santa Fe thought rates in effect Dec. 15, 1935, just prior to heavy cuts on Dec. 16, but not as high as the July 20 schedules, would be adequate. These proposals have been taken under consideration.

Some observers feel there should be no penalty to customers not on rail head points. Others feel that the man off the railroad track, with no investment in spur tracks, is not entitled to the same rate as the rail-situated customer.

This works to the advantage of the large marketer and is hard on the small customer and it was a supplier of the latter group who remarked about the goose and the golder egg and predicted that the "off-rail" customer would put on his own equipment.

Court of Appeals Upholds Lewis Patent on Refining

(*Continued from page* 9)

reflux oil, withdrawing a portion of the reflux oil, intermediate the lightest and heaviest fractions, passing the reflux oil so withdrawn counter current to steam in contact therewith to remove low boiling components, thereby yielding an intermediate fraction of higher flash point, and continuing the other portion of the reflux oil counter current to the vapors in an earlier stage of the fractionating system.

"2. In the art of fractionally distilling hydrocarbon oils, the method which comprises passing vapors of the oil counter current to and in contact with reflux oil, withdrawing a portion of the reflux oil intermediate the lightest and heaviest fractions, subjecting the reflux oil so withdrawn to direct contact with steam to separate low boiling point components, returning the vapors of the separated low boiling components into the fractionating system, and continuing the other portion of the reflux oil counter current to the vapor in an earlier stage of the fractionating system."

Lewis' disclosures and claims present a whole process, accomplished in one unit and one distillation, which supplanted the older art which, according to testimony, obtained one or two products from each of a series of distillations in successive units. The lower court held in effect that Lewis combined these separate operations, old and known to the art, in which combination each of the steps functioned as it did when operated separately, thus contributing no new idea to the practice.

Basis of Reversal

The circuit court opinion reverses this holding. It states that the trial judge showed no finding of fact that the combination of the elements in Lewis had been disclosed in any earlier patent. The new opinion does find facts, in the uncontradicted testimony of a trial witness to prove that Lewis first disclosed the idea, and therefore was the inventor of the methods given in the claims.

The witness referred to stated, in part: "With these earlier fractionating columns we took from that column only two products, a top and a bottom product. * * * * So that for each intermediate product we had to have another still and another fractionating column." And further: "They started off with two of these towers, and finally ended up with five. * * * * We made either five or six cuts from those stills. Five or six streams; they were not to specifications. To get them to specifications we took them out and re-ran them."

The Lewis combination of distillation of several streams from one unit which were stripped with steam in that unit is held by the circuit opinion to constitute novelty, in that one still and tower "could completely distill petroleum". In this light the judge states the patentee, Lewis, solved the problem as outlined in his claims. "That it effected a new result must be conceded."

"From these (claims in the Lewis patent) it will clearly appear that no old element continued to work in its old way to produce certain by-products, but that each and every element was necessary and co-operated in a new way to effect complete recovery of all by-products by an unitary, single and all-effective distillation."

Savings Claimed

Another angle of the trial testimony which affected the court's opinion was the fact that the new type of distillation usually displaced older, shell type distillation units. Savings of considerable magnitude were effected, according to witnesses' testimony; fuel consumption was reduced they said, as was consumption of water and steam, and labor costs were reduced.

The suit in which this most recent opinion was handed down is one of two filed in November, 1933 by members of the Petroleum Distillation Corp., each against the same defendant. Of the three patents involved in the two suits, one is validated and infringed as of present court records, and two invalidated. Counsel for the defendant could not be reached at this time, but officials of interested companies stated that they do not believe the case will be dropped in its present status but that further action will be taken by the defendant. This action may take the form of a petition to the Circuit Court of Appeals for the Third District, or the U. S. Supreme Court or both, for a rehearing; or other action may be taken as defendant decides.

Is Test Case

Petroleum Distillation Corp. was organized a few years ago by Atlantic Refining Co., Standard Oil Development Co. (New Jersey), Standard Oil Co. of Indiana, and Foster Wheeler Corp. Distillation patents owned by these companies were included in the assets of the Petroleum Distillation Corp., and two suits were filed to test the validity and infringement of the above mentioned patents, which are part of a list of some 140-odd owned by P. D. C. Later Foster Wheeler withdrew from the company, and is not now a part of it.

It cannot now be foretold what further action P. D. C. may take, in court or out, to eliminate infringement of this patent from refining practice. General refining practice utilizes very generally the stripping of side streams and the taking of more than one stream from the tower, in one way or another. How much of this present practice infringes the Lewis patent it is impossible to conjecture.

Letters TO THE EDITOR

More on Status of Oil Patent Litigation

Following the discussions which have appeared in NATIONAL PETROLEUM NEWS recently (Dec. 8, page 9; Dec. 15, page 19; Dec. 22, page 19), on the present status of oil cracking and treating patents, the following letter adds some further information on this subject, which should be interesting to all concerned.

From the patent attorney for a large oil company.

"Your article entitled 'History of Cracking Patents Shows Courts Validated Few' (N. P. N. Dec. 22, 1937) moves me to comment, not on the opinions expressed therein, but on the facts concerning patent litigation in the petroleum industry.

"You say, 'With all the litigations of the past quarter of a century, fifteen oil-treating patents have been tested in the course of which, they show, all but three have been declared invalid or not infringed.' The word 'Cracking' in the title is inferentially synonymous with the words 'oil treating', but the cases you cite as illustrating your point include the Saybolt and the DeBrey patents, which relate to the casinghead industry. Also, you include the distillation patent controversy.

"In recent years eight cracking patents have been sustained and six have been knocked down. Trumble, Dubbs, Egloff, three Bell patents, one Cross and one Black patent stand valid as of the present moment, and Howard-Loomis, another Cross patent, Rosenbaum, Adams, Lewis and Cooke, and Shaeffer and Brown have been held invalid or not infringed. The Bell case is on appeal. The Howard-Loomis patent is being re-litigated in another circuit.

"It is always dangerous to

draw a conclusion about a patent until the appellate courts have spoken, as, for example, in the P. D. C. case which you refer to in your article; for while your story was being set in type the Third Circuit Court of Appeals was in the process of reversing the lower court. The Lewis (Atlantic) patent on side-stream stripping was upheld on appeal and an accounting ordered.

"Any experienced patent attorney would affirm the fact that this record is not quantitatively different from the record of patent litigation in other industries. More litigated patents are knocked down than are upheld — always. The reason for this seems obvious to me, although I must confess that many are misled by the statistics.

"American business men as a class are not reluctant to recognize the moral and equitable principle that they should not use, without permission, inventions developed and/or paid for by others except under license. If the patent claims appear justified, refiners, like other business men, usually take licenses *without litigation*.

"Many of the most important patents issued in our industry were never litigated at all, for the simple reason that their merit is recognized offhand and refiners who wish to use the process purchase licenses willingly. Unless some outside factor, such as an enterprising defense pool or a universal demand couples with unreasonably high royalty rate intervenes, the 'best patents' usually don't even reach the courts.

"Consider, for example, the recent settlement of the seismograph litigation and the many licenses that have been purchased for various dewaxing and solvent extraction processes. Consider the patents of Cottrell and others on electro-static precipitation, which inventions are used throughout the whole ramification of the petroleum industry, commencing with the treatment of crude and ending with the treatment of sulfurous gases emitted from refinery stacks.

"I have no desire to burden this letter with detail, but if you are interested I could cite twenty patents bearing on the petroleum industry in its various ramifications which have been sustained in recent years, and a probably just as large or larger number have been held invalid or infringed. Perhaps some really accurate statistics on the over-all subject might be of interest to your readers. In any event, I am quite sure that you were misled on the statistics which you used in this particular article."

Greater Use Of Pipelines To Move Gasoline in 1938

N. P. N. News Bureau

CLEVELAND, Dec. 27.—Four recent developments presage the spending of many millions in 1938 by oil companies for construction of gasoline pipelines:

1. Announcement that the Shell Petroleum Corp. is already expending $5,000,000 for construction of a gasoline line from its Wood River (Mo.) refinery to Indianapolis, Ind., and thence to Toledo, O.

2. Plans of four Mid-Continent refiners for a $12,000,000 gasoline pipeline from Oklahoma refinery points to the Mississippi River via Des Moines. Consideration of the line, first proposed last summer, was revived under threat of a general 15 per cent railroad rate increase. That such an increase, if granted by the Interstate Commerce Commission, will stimulate the economic practicability of gasoline pipelines is considered likely by many oil companies.

3. A general mounting trend in motor fuel consumption. Five per cent more gasoline will be consumed in 1938 than in 1937, according to estimates compiled today. 1937 consumption will be in excess of 9 per cent above 1936, according to most recent figures available. 1936 in turn was 10 per cent over 1935; 1935 a 6 per cent increase over 1934.

4. The rapid increase in the movement of refined oil products by pipeline since 1931, the first year Interstate Commerce Commission figures are available on such transportation. The 1937 figures have not yet been made public, but five gasoline pipeline projects of importance were begun or completed in this year, which will increase considerably the total for refined products moved by pipeline in 1937, as compared with 1936, the latest year for which official figures are available.

The majority of what is reported by the I.C.C. as refined products is finished gasoline, moving from refineries to distribution points. A small portion, however, is light products moved in crude lines to refineries for processing.

Many Products in Line

Pipeline engineers also point out that the improvement in gravity recording instruments now makes it possible for the shorter lines to transport a number of different oil products without fear of contamination and with very little actual loss between lots. One company ships nine products through its line. Instruments record immediately a change in gravity and, by placing the products properly in the line, the loss between batches is said to be only three to six barrels.

The use of pipelines to move refined products is in no wise comparable to the use of the vast pipeline system which the oil industry has developed, owns and operates to transport crude at a lower cost than by railroad. Yet a study of Interstate Commerce Commission reports of movement of refined oils in interstate commerce indicates that roughly 10 per cent of the motor fuel consumed in the U. S. moves via pipelines, for at least part of its journey from refinery to consumer.

The Interstate Commerce Commission does not separate gasoline from other refined products in its reports but shipments of refined oils, mostly gasoline, have steadily increased. In 1931, interstate pipelines transported 18,281,435 barrels of refined oils. By 1936 a total of 55,000,000 barrels of refined oils were shown as transported by interstate lines. This figure is in excess of 10 per cent of the motor fuel consumption that year—467 million barrels. If intrastate gasoline pipeline shipment figures were available the percentage would be increased.

Five Major Projects

Principal gasoline pipeline projects during 1937, in addition to that of the Shell Petroleum Corp. from Wood River to Toledo, detailed elsewhere in today's issue, are as follows:

Lion Oil Refining Co. Completion of a 12-mile line from its refinery at El Dorado, Ark., to the Ouachita River. The 6-inch line permits the company to reach the Mississippi River bulk plants via barge.

Great Lakes Pipeline Co. has operated 1500 miles of trunk line from Oklahoma refining points to northern marketing centers in the middle west. Lines run from Muskogee, Okla., north to Minneapolis, Minn., with branches to Omaha and Chicago. Terminals are at Des Moines and Kansas City.

In April, 1937, Great Lakes started a program of replacing, between Oscela, Iowa, and Omaha, Neb., 100 miles of 4-inch pipe with 6-inch pipe, and to parallel its line between Barnsdall, Okla., and Kansas City. It also opened construction of a 6-inch loop between Des Moines and Minneapolis and St. Paul.

Eight oil companies ship through Great Lakes and their combined gasoline gallonage through its pipeline was reported to be 12 per cent of the gasoline consumption of the 10 states served by the Great Lakes Pipe Line Co.

The companies are Skelly Oil Co., Continental Oil Co., Barnsdall Refining Corp., Mid-Continent Petroleum Corp., Pure Oil Co., Phillips Petroleum Co., Sinclair Refining Co. and The Texas Corp.

Great Lakes transported 12,040,994 barrels originating on line, and 3,701,000 barrels received from connecting lines—said to be all gasoline—in 1936, by far the largest volume of any gasoline line in the country, according to the I.C.C. reports.

One to Buffalo

Keystone Pipe Line Co. A $1,700,000 extension of its gasoline pipeline was started in July, 1937, by this transportation subsidiary of the Atlantic Refining Co. Keystone transports gasoline from Philadelphia to Pittsburgh and 7,150,670 barrels moved through the line in 1936. The

Interstate Transportation of Refined Products By Pipeline in 1936

(Figures in barrels as reported by Interstate Commerce Commission)

Line	Oil Transported Originated on Line	Oil Transported Received from Connecting Lines
Atlantic Pipeline Co.	.....	102,042
Detroit Southern Pipe Line Co.	3,891,128	.....
Great Lakes Pipe Line Co.	12,040,994	3,701,083
Humble Pipe Line Co.	882,719	.....
Keystone Pipe Line Co.	7,150,670	.....
Magnolia Pipe Line Co.	822,466	.....
National Transit Co.	159,864	.....
Phillips Pipe Line Co.	9,107,821	3,161,988
Sun Oil Line Co.	.....	2,041,799
Sun Pipe Line, Inc.	.....	1,876,100
Susquehanna Pipe Line Co.	8,940,798	.....
Texas Pipe Line Co. (of Texas)	3,516,112	58,168
Tuscarora Oil Co., Ltd.	4,994,316	.....

extension called for a line from Williamsport, Pa., to Buffalo, a distance of 213 miles to be covered with 8-inch pipe.

Standard Oil Co. (Ohio). Standard of Ohio constructed in 1937 two gasoline pipelines which, while comparatively short, point to possible pipeline construction by other oil companies faced with distributing gasoline in traffic congested areas.

These lines were completed at a combined cost of about $750,000. They operate from Toledo (O.), and Cleveland refineries to distribution points nearer the center of Sohio's marketing territory.

As such they have the advantage of minimizing transport hauls on congested inter-city highways. The 38-mile line from Toledo to Fostoria, O., is now in operation; the 67-mile line from Cleveland through Akron to Canton, O., will be completed in the near future.

Sohio also has under consideration a line from its Latonia (Ky.) refinery (Cincinnati) to Ohio cities of Dayton and Springfield, a distance of 80 miles.

Effect of Rail Rates

How the proposed 15 per cent freight rate increase has revived plans for construction of pipelines to transport refined oil products was illustrated last week with the revival of the proposal of four Oklahoma refiners to construct a gasoline line from Granfield, Okla., and other Oklahoma refinery points to Des Moines and thence east to the Mississippi River. This would enable the four refiners to barge their products on the Mississippi.

M. H. Champion, traffic manager for Anderson-Prichard Oil Corp., and Coltex Refining Co., outlined more details of the proposed gasoline line at a conference in Tulsa Dec. 15 of Mid-Continent refiners shipping by tankcar and truck. The gasoline line, he said, would cost approximately $12,000,000.

The four refining companies jointly contemplating the line are Anderson-Prichard Oil Corp., Oklahoma City; Bell Oil & Gas Co., Tulsa; Cushing Refining & Gasoline Co., Cushing and Rock Island Refining Co., Duncan.

It was also contemplated to construct a branch line down to Colorado, Texas, where Anderson-Prichard's subsidiary, Coltex Refining Co., operates a refinery.

National Transit Co. Listed 159,864 barrels of refined oils as transported in 1936, but primarily a crude carrier in the Pennsylvania field.

Phillips Pipe Line Co. Line from Borger, Texas, to Kansas City and East St. Louis. Reported 9,107,821 barrels of refined oil originating on line transported in 1936 and 3,161,968 barrels of refined oils received from connecting lines.

Sun Oil Line Co. A 98-mile line from the eastern Ohio border to Akron and Cleveland. Sun Oil Line Co. reported 2,041,799 barrels of refined oils—practically all gasoline—for 1936.

Sun Pipe Line, Inc. Operates from the New York-Pennsylvania line to Syracuse, N. Y., a distance of 88 miles. Carried 1,876,100 barrels of refined oils in 1936.

Susquehanna Pipe Line Co. Transported 8,940,798 barrels of refined oils in 1936 from Philadelphia north to Syracuse and west to Pittsburgh. All three of the above companies are affiliated with the Sun Oil Co. and doubtless the gallonage of the first two is duplicated in the Susquehanna pipeline figures.

Thirteen Gasoline Carriers

The Great Lakes Pipe Line Co. and the Keystone Pipe Line Co. are two of the 13 interstate gasoline pipelines reporting to the Interstate Commerce Commission. The others, their points of origin, terminals and volume of refined oil products in 1936 are as follows:

Detroit Southern Pipeline Co. Operates 84 miles of 6-inch trunk line from Toledo, O., to Detroit, Mich. Transported a total of 3,891,128 barrels of refined oils in 1936.

Humble Pipe Line Co. Operates in Texas and part of New Mexico to Gulf Coast. Transported in 1936, 882,719 barrels of refined oils in addition to crude oil. Primarily a crude oil line, however.

Magnolia Pipeline Co. Carried 882,466 barrels of refined oils in 1936, but primarily a crude carrier in Texas, Oklahoma, Louisiana and Arkansas.

Texas Pipe Line Co. Reported 3,516,112 barrels of refined oils originating on the line and 58,168 received from connecting lines.

Tuscarora Oil Co., Ltd. A subsidiary of the Standard Oil Co. of New Jersey, Tuscarora transported, in 1936, 4,994,316 barrels of refined oils. Extends from Bayway on New York Harbor to the western line of Pennsylvania, a distance of 585 miles.

Atlantic Pipeline Co. A subsidiary of Atlantic Refining Co. transporting primarily crude in Texas, with terminal points at Atreco, Texas City and Harbor Island, Texas. Reported to the Interstate Commerce Commission handling 102,042 barrels of refined oils received from connections in 1936.

Conservation a Dam That Holds Crude Supply to Normal Demand

N. P. N. News Bureau

TULSA, Dec. 27.—Conservation in crude oil production, as now practiced in the important producing states in the southwest, is contributing materially to the stability of the oil industry in general, in the opinion of officials of these states.

The accomplishment of sane conservation and proration methods has made it possible for the oil companies to make "almost peak profits in 1937," according to Col. Ernest O. Thompson, member of the Texas Railroad Commission, and chairman of the Interstate Oil Compact Commission, the agency representing the states which are members of the federally-approved interstate oil compact.

Kansas is closing the best year in the oil industry it has ever had and it is the opinion of the chairman of its state corporation commission that the year 1938 will exceed 1937.

The Oklahoma oil industry will start 1938 in excellent condition, states the chairman of its corporation commission and Gov. Marland, of Oklahoma, states; "Conservation in the various oil producing states has contributed greatly to stability in the petroleum industry."

These opinions are explained in detail in statements from state authorities in some of the oil producing states secured by NATIONAL PETROLEUM NEWS within the past few days. The complete statements are as follows:

By Gov. E. W. MARLAND, of Oklahoma

"Conservation in the various oil producing states has contributed greatly to stability in the petroleum industry, and to my mind is more necessary now than ever before in light of the growing demand for petroleum and its products and the relatively limited assured supply.

"The task of the petroleum industry in the future will be to conserve rigidly its reserves and to find more."

By Col. ERNEST O. THOMPSON, Chairman Interstate Oil Compact Commission and Member Texas Railroad Commission.

"In my opinion crude oil demand will increase about six per cent in 1938 over 1937. Proration and conservation have become thoroughly indoctrinated into the law and universally accepted by the industry in the U. S. It has worked surprisingly well in the states that have tried it, and those states that have not yet passed statutes upon the subject will, in my opinion, do so if sufficient oil be discovered within their boundaries.

"It is interesting to note that in the last two years the number of oil operators in Texas has increased by 1241. This shows that proration does not squeeze the little fellow out, but on the contrary, strict proration and enforced conservation make for stability and enable the little operator to obtain adequate finances at low rates with sufficient length of time for pay-off to develop his properties on an equality with the largest companies.

"Proration and conservation have benefitted the state of Texas by developing and conserving our oil reserves. It has enabled every producer to share ratably in the market, there being no unconnected wells in Texas; and further than this, it has secured and insured an adequate dependable supply of gasoline for the consumer at extremely low prices.

"With all these things having been accomplished, the oil industry finds itself also making almost peak profits for 1937. It has been a pleasure to have had a part in the regulation of this industry which has shown the way for other producing industries towards sane prosperity.

"This statement would not be complete if I did not bespeak a word of gratitude for the splendid co-operation that has been given me as Chairman of the Interstate Oil Compact Commission by the other members of the Commission, who have worked so hard to bring about the present happy situation."

By REDFORD BOND, Chairman Oklahoma Corporation Commission

"The oil industry will start the year of 1938 in excellent condition. This commission will continue as in the past to do everything in its power to conserve this great irreplaceable natural resource in which all the people of the nation are so vitally interested.

"Our latest figures show that during the year of 1937 our state has stayed within the Bureau of Mines estimate of the market demand for crude oil due to the

Mid-Continent SKYLINE

By LAWRENCE E. SMITH, N. P. N. Tulsa News Bureau

TULSA, Dec. 24.

It is customary to write this little discussion every Saturday but, like the oil industry, we also knocked off Christmas day. Well, that's not quite accurate. Most of the industry unhitched a day early and some people didn't seem to do much all week except talk about their Christmas cards, and so on. So there wasn't much news about the premises and the Holiday note would intrude whenever anybody asked about oil.

Well, seeing there was no news, we might as well review some of the Christmas cards. A. V. Bourque, secretary of the Western Petroleum Refiners Assn., turned in a nifty number bearing a snapshot of himself and that big, fuzzy chow dog of his. Mr. B.'s expression is one of good will to all men but the dog looks as though he wished the photographer would get the hell and gone away from there. The whole was tastefully garnished with holly and appropriate sentiments.

Gen. Baird H. Markham, director of the American Petroleum Industries Committee, sent from New York a little brochure of four pages, the inside of which was all right, containing what we took to be an original "poem" filled with good wishes, but the front cover was pretty depressing. It showed Santa atop a tree the trunk of which was a gasoline pump and the old saint was shelling out at a great rate, putting his money into boxes hung on the tree. The boxes were for the collection of all kinds of taxes.

Bill Armstrong, the Oklahoma conservation officer, slid his Yuletide greeting into the envelope which carried the proposed proration schedule for January.

Jim Noland and Ralph Curtis, of Barnsdall Oil Co., extended "unprorated Season's Greetings" and got themselves up an acrostic which spelled "Barnsdall" right down the middle.

The Quo Vadis Cylinder Honing Corp. sent in some tender thoughts and asked to be remembered on the next ring job.

Burdette Blue, Indian Territory Illuminating Oil Co., chided us delicately for not having been around to see him lately, which same rebuke is acknowledged and threat is made that he will be visited soon unless he can find a court to take jurisdiction and enjoin us.

D. E. Buchanan, of Hanlon-Buchanan, Inc., was lavish in his wishes and, whether he intended it or not, that winter scene on the front of his card was a delicate reminder that cars start much better on volatile gasoline.

One of the local banks inquired whether we could reduce the note a little. It seems the government is about to take inventory.

Emerson G. Smith, director of publications for Continental Oil Co., sent out a card with raised printing on it, carrying a dignified seasonal felicitation.

But we have used up all our space and to those not mentioned we extend a general thanks. The one exception is that bird whose rubber check we have held since 1932. It takes nerve to send a greeting card under such circumstances.

* * *

Oklahoma Allowable

That Oklahoma's allowable production for January be set at 550,000 barrels daily, the same as for December, is the recommendation William J. Armstrong, chief conservation officer, will make to the state corporation commission at the hearing, Dec. 29. A few minor changes in pool quotas will be suggested, none of importance.

If the commission acts on Armstrong's advice, the allowable for Oklahoma for January will again be below the Bureau of Mines forecast of demand. The bureau estimate for January was 588,800 barrels daily.

The recently formed Kansas Independent Oil & Gas Assn. through President E. B. Shawver, asked the corporation commission of that state to permit 186,000 barrels daily to be produced in January. The Bureau of Mines forecast demand for 179,300 barrels. The amount urged by the producers' association is the same as the December Bureau of Mines estimate.

* * *

Gas Markets Growing

Preliminary figures for 1937 issued by Alexander Forward, managing director of the American Gas Assn. show that the industry served 17,022,000 customers, the largest number in history and an increase of 517,000 over 1936. Of these, 7,046,000 used natural gas. Revenues of natural gas companies grossed $441,176,000, a gain of 6.9 per cent for the year.

The total volume of natural gas used was 1,336,863,000,000 cubic feet. The 42,000 industrial users took 870,909,000,000 feet; the 502,000 commercial consumers accounted for 103,933,000,000 feet and the 6,502,000 domestic users burned 362,021,000,000 feet. Industrial consumers increased their use by 10.3 per cent for the year.

Rule On Dyeing Tax Exempt 'Gas' Gets Court Test

By Telegraph

WICHITA, Kans. — The controversy over the right of the Kansas gasoline tax collector to rule that tax exempt gasoline must be dyed and that the dye must be purchased from the state is going to be taken to Kansas courts for settlement.

A large group of Kansas jobbers, many of them members of the Kansas Oil Men's Assn. and the Independent Gasoline Distributors of Kansas, a retail dealers' organization, will be parties to the court action. They have retained Judge William Yochum, of Wichita, former member of the state supreme court.

A petition is expected to be filed Dec. 29 in the Shawnee county district court, at Topeka, asking that Director J. L. Grimes, of the Department of Inspections and Registrations, be enjoined from enforcing his ruling. The case is expected to be taken to the Kansas supreme court for final settlement.

Follow Governor's Advice

At the time of the mass meeting of oil men in Topeka with Gov. Walter A. Huxman Dec. 14, the mahogany dyed gasoline ruling was raised. The governor candidly told the oil men that while the attorney general had ruled that Grimes could issue such a ruling, if they did not think the state constitution permitted such a step, the thing to do was to get a good lawyer and test it out in the courts.

Director Grimes' ruling that all tax exempt gasoline sold in the state must be dyed mahogany color by the seller at the time of delivery is scheduled to become effective Jan. 1. Reports from Topeka indicate a number of jobbers already have ordered their dye from the department.

The dye costs the jobber approximately three fourths of a mill a gallon. It is put up in one-gram and five-gram envelopes, the former being sufficient for 10 gallons and the latter for 50 gallons. The director has ruled that tax exempt gasoline must be sold in multiples of 10 gallons, the minimum sale being 40 gallons.

The jobber under the ruling must maintain an inventory of dye and must report each month to the department the amount of dye on hand at the beginning of the month, purchases from the department, amount used to color tax exempt gasoline during the month and amount of dye on hand at the end of the month. The dye used for coloring also must check with the total tax exemptions claimed by the jobber or he will be called into Topeka to explain, the director has ruled.

New Kansas Oil Group Launches Program

N. P. N. News Bureau

TULSA, Dec. 27.—The newly-formed Kansas Independent Oil and Gas Association launched a program this week to increase the market for Kansas oil and to oppose legislation harmful to the industry.

The association organized in Wichita the night of Dec. 17. E. B. Shawver, Wichita producer, who issued the call for the meeting, was elected president by a board of 36 directors elected at the meeting. The board is representative of independent operators throughout the state.

D. R. Lauck of Wichita, is first vice president; John Denman of Independence, second vice president; A. H. Witt of Russell, third vice president; F. G. Stodder of Wichita, secretary and Joe Aylward of Wichita, treasurer.

It is planned to employ an executive manager who will keep in contact with the Kansas Corporation Commission, the U. S. Bureau of Mines and the Interstate Compact Commission. Necessary finances probably will be obtained through assessment of members on the basis of oil and gas produced.

cut back that we have made the last four months.

"The people can depend upon this commission to continue in the future the policy it has pursued in the past to enforce the conservation rules and regulations and to prevent waste in the production of oil and gas."

By ERNEST E. BLINCOE, Chairman State Corporation Commission, Kansas

"Kansas is just closing the best year in the oil industry it has ever had and with the increased wells and new fields developed this year it is my opinion that the year 1938 will exceed that of 1937. I believe that the conservation policies of the commission have added much to prevent waste and permit equitable taking as between wells and the sound policies of the commission has tended to materially stabilize the industry. The commission proposes to continue its present conservation policies."

PAB-Arnott Clash Related by Frey

(*Continued from page* 9)

change the conditions imposed by the April 22 letter. The meeting was primarily on the general stabilization problem, he said.

"Called On Carpet"

When Hammond E. Chaffetz, government counsel, asked if Arnott was called "on the carpet" in the May 8 meeting, Frey replied, "Yes."

The May 8 PAB meeting was taken up also on re-direct examination of Frey. Concerning approval for buying activity, Frey said the question came up incidentally near the close of the meeting. Arnott reported buying was going on informally, Frey said, and that there was no pool.

The May 8 meeting was the scene of hot exchanges between Arnott and Charles Fahy, PAB chairman, said Frey.

The trial resumed Dec. 28 after the Christmas recess with cross-examination of Dr. John W. Frey, former member of the Petroleum Administrative Board, by Government Counsel Chaffetz.

Chaffetz questioned Frey concerning a statement that the Ickes-Arnott letter of July 20, 1934, gave Arnott no authority under the code, and Frey testified he could not remember whether the statement was made at a meeting of the PAB on March 12, 1935, but thought it was made at a PAB meeting on May 8, 1935.

Chaffetz asked why the May 8 meeting of the PAB was called, and the jury was withdrawn while counsel argued over admission of details.

When the jury was recalled, Frey testified that the PAB wrote a letter to Arnott on April 22, 1935, informing him of three conditions under which the stabilization work should be conducted. The letter also informed Arnott, Frey said, that jobber and dealer associations had complained about the moratorium on transfer of dealers between jobbers, lack of representation on the stabilization committee, and the closed or secret meetings of the stabilization committee.

Committee Objected

"The stabilization committee," Frey said, "objected to our April 22 letter, and didn't think it practical to operate under the three conditions imposed."

The committee came to Washington to change those conditions, Frey continued. He contended it was not always possible for a government representative to be present, or for all factions in the industry to attend any one meeting. The meeting on May 8 was primarily on the general problem of stabilization, the witness said.

Replying to a question by Chaffetz, Frey said, "we always wanted to know what Arnott was doing and didn't always know."

When Chaffetz asked if the meeting on May 8 was to call "Arnott on the carpet," the witness replied, "yes." Frey then said Jack Carnes, Allen Jackson, H. T. Ashton, and Arnott were present.

"Didn't Arnott state he was not acting under any government authority?" Chaffetz asked.

"Not quite that way," Frey replied, "but he didn't ask for any authority."

Chaffetz then asked the witness whether he recalled Carnes of Sinclair telling him that Sinclair was buying more gasoline than the company needed but felt they had to do it to bring about stabilization.

Judge Stone overruled repeated objections of defense counsel, and Frey then told of a conversation he had with Carnes in the spring of 1935 in which he recalled that Carnes had said the company was buying more gasoline than it needed but that he could not recall any remark about the buying being done to aid stabilization.

Questioned by Donovan on redirect examination, Frey testified that oil men at the May 8 meeting, previously identified by oil company affiliation on questioning from Chaffetz, were members of the stabilization committee of which Arnott was chairman, and were present in that capacity. Collett, chairman of the Planning & Coordinating Committee, also was present, Frey said.

Frey defined "moratorium" as

(*Continued on page* 22)

'37 Best Oil Year Since '29, Farish Says

N. P. N. News Bureau

NEW YORK, Dec. 28. — Good demand, balancing of supply and demand and fair prices combined to make 1937 the best year since 1929 for oil industry earnings, W. S. Farish, president of the Standard Oil Co. (N. J.), said today in a year-end review. Text of his statement follows:

The oil industry has made its best record for net earnings this year since 1929. With better earnings came a record production of crude oil, with increased demand both for domestic consumption and for export.

This pleasant experience of the oil industry came about through three principal causes: 1—an increase in consumption greater than had been anticipated; 2—a reasonably well balanced relationship between supply and demand; and 3—a fair level of prices. The extent of the increase in consumption was particularly gratifying even to an industry which has grown accustomed to sustained demand for its products. Only during the depression years, 1931 to 1934 inclusive, have the annual purchases of gasoline failed to register an increase over any preceding year since the first automobile was built. Even during the depression years the minimum annual consumption amounted to 90 per cent of that of the previous peak year, 1930. Because of this experience the industry looks forward confidently to a maintenance or even a small increase in demand in 1938, in spite of the recent and current decline in general industrial activity, and in spite of a probable reduction in exports which were unusually heavy through 1937.

Demand kept abreast of supply in fairly good order during 1937 in the face of intensified drilling and other activity in production and finding effort. America drilled more wells for oil in 1937 than in any previous year since 1920, when drilling activity reached an all-time peak. No outstanding discoveries were made, however, and the proven reserve situation remains, as it has for several years now, with annual additions through discovery roughly balancing annual withdrawals for consumption.

There is some tendency in the industry to overproduce its market, even with the quickened demand, and the end of 1937 will see gasoline inventories increased to levels considerably higher than sound economy dictates. It appears likely that we will enter the gasoline-consuming season in 1938 with 93 million barrels of gasoline in storage, 12 million barrels more than the wholly adequate stocks we had on hand at the corresponding date in 1937.

The satisfactory prices received by the industry in 1937 probably reflect the active state of industry in general through most of the year. It is worth while to note in this connection that gasoline users are still able to fill their tanks at prices (excluding tax) lower than pre-war levels. This statement can be made of few other commodities.

All through the depression the industry has continued to increase investment and to engage in new construction. The year just ended has witnessed greatly increased operating and capital expenditures. The demand for greater quantities of products of improved quality has made this expansion imperative and the end is not yet. With an investment already amounting to some 13 billion dollars the industry faces the prospect of continued large capital outlays through 1938. Its normal business, therefore, will necessitate substantial purchases of material and wide employment of labor during the coming year.

PAB-Arnott Clash Is Related at Trial

a "recommendation on the part of the stabilization committee in Illinois" for a period in which there would be no transfer of dealers between jobbers. The witness said there was no agenda for the May 8 meeting, although Shaughnessy (PAB lawyer) had prepared a report for Fahy covering the entire subject of stabilization.

Donovan sought to get an opinion from the witness as to whether or not he thought the dumping of distress gasoline on the market was an unfair trade practice. Objections of government counsel were sustained.

The defense attorney then asked about encouragement from the PAB of action on the part of the industry to bring about parity between crude and gasoline prices. When asked if Ickes had urged price parity, Frey replied, "Yes."

"What did he say?" Donovan asked.

Parity Is Urged

"In the presence of members of the PAB in his office," Frey related, "following submission of the Blazer report in March, he said that if parity between crude oil prices and gasoline did not come about soon — within three or four weeks — he would call a meeting of representatives of the industry to do something about it."

Frey then identified a copy of the Blazer committee's report, named the members of the committee and their company connections, and testified that they were on special government duty and were paid on a per diem basis.

Chief Defense Counsel Donovan opened the afternoon session by presenting papers relating to the Blazer committee's report for evidence.

These included pages 30 through 32 of the report, copies of the letter of March, 1935, of five committee members to Ickes, letter of April 8, 1935, from Fahy to Collett, copy of the telegram of April 23, 1935, from Fahy to Blazer, telegram of April 23 from Blazer to Fahy, and press release of May 7, 1935, by the Interior Department on Blazer's committee report.

Judge Stone sustained all objections, except as to admittance of the May 7 press release. Later Donovan offered the full report as released by the Interior Department and the objection was sustained.

Chaffetz objected on account of Frey, at the opening of the session, saying Blazer's report was not adopted by the Secretary of the Interior. Donovan read the May 7 press release to the jury.

In offering Blazer's report, released by the Interior Department, Donovan said the offering was to show no secretiveness or furtiveness on the part of the defendants and that he wanted to show that buying activities had been brought to attention of the Interior Department secretary.

Report Is Offered

Frederick Wood, Sinclair attorney, also offered the report on the grounds of establishing knowledge and acquiescence of government authorities and for its bearing upon the reasonableness of the conduct of the defendants. Also, he said that it was proper to show the objectives of government, and knowledge of government officials on the bearing of the question of knowledge and acquiescence and reasonableness of purpose.

The court related that after all the government had outlined its ideas of what should be done under the code. Chaffetz said the code showed exactly the way the objectives of the code should be reached and that it was an undisputed fact now that approval was not asked. "There is no issue of government approval or acquiescence in this case," Chaffetz said.

Donovan replied that the defendants were not here for any violation of the code, but were charged with a Sherman act violation.

Re-direct examination of Dr. Frey began by Donovan asking concerning the March 12 PAB meeting and the parity of crude and gasoline prices. Frey defended surplus gasoline as "gasoline forced on the market for one circumstance or another, usually at a lower price than that prevailing; usually due to over-supply." Frey said, as a PAB member, he observed that distress gasoline was an obstacle to $1 crude in February, 1935, and that "hot" oil also was an obstacle.

Relates Policy on Parity

"Secretary Ickes considered it was an undesirable state of affairs", said Frey, when asked the policy of the Oil Administration on the relation of those obstacles to parity, "for gasoline at the refinery not to be on a parity with crude, especially for small refiners."

Distress gasoline encourages the number of intensified price differentials, Frey related, and "very frequently was responsible for price wars."

Objections to Donovan's questions about the PAB not telling Arnott to stop buying activities, and to questions about lack of parity in Pennsylvania prices were sustained.

Argument between counsel resulted in the judge rapping his gavel for order and remarking that lots of time was wasted during the morning. Donovan replied it was not his fault and the judge acknowledged it as the court's fault.

Further questioning of Frey about the Pennsylvania situation resulted in the government's objections being sustained. Frey then gave, as his judgment, that it was impossible to maintain normal retail markets with sub-normal tank car markets.

Qualification Told

Between the question and answer Frey was asked by the court about his experience in selling gasoline, or working in a refinery or oil field. Frey said he never worked for any oil company, had been a student of petroleum for 20 years, and was an expert witness for the government in the oil cases of Mills at Baltimore and Silverman in Detroit.

Frey then said he would not consider it unusual for major companies to buy in anticipation of future needs. Frey said he knew of distress gasoline through the Bureau of Mines reports, and reports of the federal tender board, in March, 1935, and of East Texas allowables.

Estimates given by Frey of distress gasoline in 1935-36, were approximately 600 to 700 tank cars a month in the Mid-Continent, the same in East Texas, and an amount unknown to him in Louisiana.

"Just how did the question arise when Arnott said he was

(*Continued on page 24*)

"Lost" Part Of Anti-Trust Law Is Pointed Out

N. P. N. News Bureau
By Teletype

WASHINGTON, Dec. 28.—Attention of the U. S. Department of Justice has been directed to a forgotten section of the anti-trust laws forbidding passage through the Panama Canal of vessels operated by persons violating the federal anti-trust act.

This provision, enacted 25 years ago, was "discovered" by Paul E. Hadlick, secretary of the National Oil Marketers Assn., whose complaint is generally credited with bringing about the anti-trust law indictment of a number of oil companies at Madison, Wis.

Hadlick revealed he had pointed out this section to government attorneys prosecuting the Madison case. The law provides:

"No vessel permitted to engage in the coastwise or foreign trade of the United States shall be permitted to enter or pass through the Panama Canal if such ship is owned, chartered, operated, or controlled by any person or company which is doing business in violation of the provisions of Sections 1 to 27, inclusive, or of any other act of Congress amending or supplementing the same.

"The question of fact may be determined by the judgment of any court of the United States of competent jurisdiction in any cause pending before it to which the owners or operators of such ship are parties. Suit may be brought by any shipper or by the attorney general of the United States. (Aug. 24, 1912, C. 390, Para. 11, 37 Stat. 567.)"

Not Yet Used

This statute, so far as could be determined here, has never been used. However, there is an opinion by U. S. Attorney General T. W. Gregory in April, 1915, made at the request of the War Department which has jurisdiction over the Panama Canal.

Four questions, put by the War Department, were answered in this opinion.

The opinion stated that it was not up to the Panama Canal authorities to administratively determine whether the ship owner "is doing business in violation of the anti-trust laws;" that where there was no judgement of anti-trust law violation by a court of competent jurisdiction or where there was a judgement and decree entered but no question has been raised by the U. S. in appropriate judicial proceedings as to non-compliance, passage through the canal should not be refused.

Where there was a conviction under criminal sections of the Sherman Anti-trust law, or a judgment in a suit brought by private parties, the Canal authorities "might well require some affirmative showing by affidavit or otherwise that the violations have ceased," it was said.

Kans. Increases Jan. Allowable

By Teletype
N. P. N. News Bureau

TULSA, Dec. 28. — After four months of setting allowable production below the demand estimates made by the U. S. Bureau of Mines, the Corporation Commission of Kansas went above the estimate for January and set the daily figure at 186,472 barrels daily. This is 7172 barrels higher than the bureau's forecast.

The figure adopted was slightly higher than that recommended by the newly formed Kansas Independent Oil and Gas Assn. and is nearly 10,000 barrels daily higher than the allowable for December.

The Louisiana state conservation department ordered a top figure for January production of 256,000 barrels, 2000 barrels daily higher than in December.

The Arkansas Board of Conservation, after several false starts at prorating the Miller county extension to the Rodessa field, announced an allowable, effective Jan. 1, of 10,329 barrels daily from 57 wells. This conforms closely to the 200-barrel daily per well limit imposed by the pipeline companies several weeks ago.

DAILY AVERAGE PRODUCTION IMPORTANT DISTRICTS
American Petroleum Inst. Figures

	Week Ended Dec. 25	Dec. 18
	Barrels	Barrels
Oklahoma City	123,900	138,900
Total Okla....	550,300	570,150
East Texas...	489,450	418,700
Total Texas...	1,395,000	1,331,450
Rodessa	44,200	43,000
Total La.	252,350	243,200
California	704,900	710,200
E. of Rockies.	2,787,700	2,729,650
Total U. S.....	3,492,600	3,439,850
Crude imports.	76,000	59,670
Tot. new sup'ly	3,568,600	3,499,420

Natural Gasoline Assn. Will Meet May 11

N. P. N. News Bureau

TULSA, Dec. 28.—Directors of the Natural Gasoline Association of America have selected May 11 to 13 as the dates for the 17th annual convention at Tulsa. The meeting will be held at the Hotel Tulsa.

The dates chosen are immediately preceding the opening of the International Petroleum Exposition, which will give members attending the convention a chance to visit the exposition while in Tulsa.

J. W. Vaiden, director of natural gasoline operations for the Skelly Oil Co., Tulsa, has been named chairman of the program committee. Other members are R. C. Alden, Phillips Petroleum Co., Bartlesville; W. A. Baden, Warren Petroleum Co., Tulsa; R. E. Beckley, Standard Gasoline Co., San Francisco; T. R. Goebel, Shell Petroleum Corp., Tulsa; J. R. Jarvis, Lone Star Gas Co., Dallas, and P. M. Raigorodsky, Glen Rose Gasoline Co., Tulsa. The appointments were made by President J. A. Lafortune, Warren Petroleum Co. executive.

The wide spread interest in vapor lock and vapor loss road tests conducted last summer in cooperation with the Western Petroleum Refiners Assn. indicates that one session at least will be devoted to a general discussion of results obtained. Several papers also will be prepared dealing with plant operations, gas contracting problems, and significant developments in the refining industry that may affect natural gasoline manufacture and distribution.

The average passenger motor vehicle now consumes more than 600 gallons of gasoline per year.

Gas and Fuel Oil Stocks Decline 1,130,000 Barrels Dec. 25

N. P. N. News Bureau

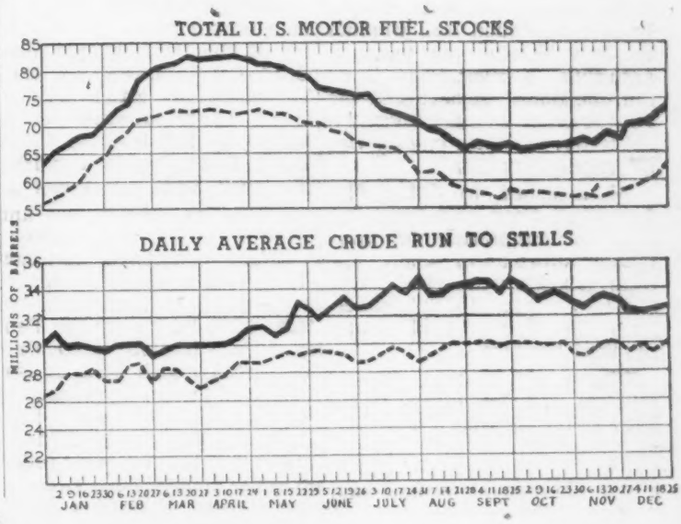
NEW YORK, Dec. 28. — A further decline of 1,130,000 barrels in gas and fuel oil stocks, bringing these stocks to 115,869,000 barrels on Dec. 25, was reported the past week at the country's refining plants, according to the American Petroleum Institute. Reporting plants were operating at 78.6 per cent capacity, compared with 77.9 per cent the previous week.

Crude runs to refinery stills increased 25,000 barrels daily average, to 2,910,000 barrels the week ended Dec. 25. The largest change, a decrease of 28,000 barrels was reported in California. Increases of 19,000 barrels in the Texas Gulf, of 18,000 barrels in the East Coast and 16,000 barrels in Louisiana Gulf plants, were the principal changes of the week.

Total motor fuel stocks piled up to 70,297,000 barrels, an increase of 1,050,000 barrels over the previous week. Notable among the changes were increases of 504,000 barrels in Indiana-Illinois-Kentucky; 272,000 barrels in the Louisiana Gulf; 214,000 barrels in Oklahoma-Kansas-Missouri; and 245,000 barrels in California. Only two districts indicated decreases, these being East Coast, with a decline of 267,000 barrels, and North Louisiana-Arkansas with a small decline.

Motor fuel stocks at refineries increased 1,456,000 barrels, standing at 40,068,000 barrels on Dec. 25. In-transit and terminal stocks decreased 254,000 barrels, to 23,568,000 barrels; and stocks of unfinished gasoline declined 133,000 barrels, to 6,661,000 barrels.

Largest change in gas and fuel oil stocks was in the East Coast district, where they were lowered 1,082,000 barrels. Texas Gulf stocks were down 540,000 barrels.



CURRENT REFINERY OPERATIONS

Districts	Per Cent Capacity Reporting	Daily Average Crude to Stills (Barrels) Week Ended		Per Cent of Reporting Capacity Operated Week Ended		Stocks — Thousands of Barrels — Total Finished and Unfinished Motor Fuel*		Total Finished and Unfinished Gas & Fuel Oil		Cracked Gasoline Production — % Total Capacity Reporting	Daily Av. Production (Barrels) Week Ended	
		Dec. 25	Dec. 18	Dec. 25	Dec. 18	Dec. 25	Dec. 18	Dec. 25	Dec. 18		Dec. 25	Dec. 18
East Coast	100.0	516,000	498,000	77.1	74.4	17,887	18,154	12,150	13,232	100.0	117,000	113,000
Appalachian	88.4	103,000	102,000	79.8	79.1	2,987	2,955	1,137	1,106	94.6	27,000	22,000
Ind., Ill., Ky.	92.4	438,000	436,000	89.6	89.2	11,710	11,206	6,794	6,765	98.5	140,000	145,000
Okla., Kans., Mo.	84.7	272,000	278,000	71.0	72.6	6,766	6,552	3,668	3,718	93.3	79,000	67,000
Inland Texas	56.6	119,000	112,000	59.2	55.7	2,287	2,265	1,708	1,724	71.7	33,000	33,000
Texas Gulf	95.7	702,000	683,000	88.1	85.7	10,344	10,326	11,583	12,123	98.0	154,000	148,000
La. Gulf	96.6	157,000	141,000	93.5	83.9	2,309	2,037	3,427	3,358	100.0	25,000	23,000
No. La., Ark.	63.7	42,000	40,000	72.4	69.0	425	442	507	512	77.5	7,000	8,000
Rocky Mt.	69.7	33,000	39,000	53.2	62.9	1,664	1,638	641	635	85.4	11,000	14,000
California	90.9	528,000	556,000	70.8	74.5	13,918	13,673	74,257	73,829	98.0	89,000	74,000
Total Reporting	89.0	2,910,000	2,885,000	78.6	77.9	70,297	69,248	115,869	116,999	94.8	673,000	648,000
Estimated U. S. Total (Bur. of Mines Basis)		3,245,000	3,220,000			74,437	73,288	118,659	119,919		750,000	725,000

*Includes stocks at refineries, in bulk terminals, pipe lines and in transit.

PAB-Arnott Clash Related by Frey At Madison Trial

(*Continued from page* 22)

not asking for approval at the March 12 and May 8 PAB meetings," asked Donovan.

"I think the question was raised by Fahy as to whether there was any possibility that buying going on was in violation of the anti-trust laws," replied Frey. "Arnott replied that he didn't believe there was and described what he was doing. Arnott discussed important problems of stabilization."

"Anything said one way or another about approval," asked Donovan. Frey replied "No, not about our approval."

Questioned on Approval

"How did the question arise in the May 8 meeting," asked Donovan.

"In an incidental way," replied Frey. "It was a fairly warm session. The principal subject was not buying. It came up incidentally near the close of the meeting.

"Arnott was asked whether buying continued and whether the July 20 letter was taken as authority. I think Fahy asked the questions. Arnott said the July 20 letter was not taken for authority, and that buying was going on informally."

When asked to define "informally." Frey said "that the tank car committee was supplying information where distress gasoline was, who had it, and how much. I didn't understand there was a pool or any required buying."

"There was a good deal of heat at the beginning," said Frey about the May 8 meeting, "but it ended better. Arnott was in a rebellious frame of mind. He thought we had been dealing with someone, a name like Blackall.

"Arnott came in prepared to tear up the place and did it for awhile."

A Heated Session

There were hot exchanges between Arnott and Fahy, Frey said, but the meeting calmed down.

Just before the May 8 meeting closed, Frey continued, Arnott said buying was continuing informally, there was no pool, and nobody had to make purchases, and the work was to lift distress gasoline from independent refiners.

On re-cross-examination Chaffetz asked if Frey wanted to change previous testimony — about Frey recalling that it had been definitely stated in Frey's presence that the July 20 letter gave Arnott no authority for a buying program and that there was no authority under the code.

The question was the same as the first one asked by Chaffetz at the opening of the morning session. Frey said there was no change in his testimony—that he didn't remember the exact words but that it was a characterization of the statement.

The next witness was then called, Stuart M. Vockel, of Pittsburgh, president of the Waverly Oil Works. After identification questions Vockel said he asked the PAB for a conference on April 8 and then government counsel Lewin charged the defense was "killing time." Judge Stone ordered the jury to disregard the remark. Then there was a clash between the court and Donovan over the court's remarks about telegrams previously offered and about the Pennsylvania situation as killing time. Donovan objected to the statement as unfair to the defendants and the court said the statement would stand. Donovan was over-ruled on request for withdrawal of the jury in view of the court's statement.

Brundred Called

W. G. Brundred, of Oil City, independent producer and director of the Pennsylvania Grade Crude Oil Assn. was then called by Donovan. After Donovan asked about information imparted to the PAB in 1934-35 about Pennsylvania conditions the jury was withdrawn for Donovan to submit offers of proof.

Offers concerned testimony that would be given by Vockel, Frey and Brundred about contacts with PAB over the Pennsylvania situation, particularly to meetings with PAB in May, 1935, and to correspondence between E. B. Swanson, of the PAB, and Arnott over Mid-Continent stabilization being reflected in the Pennsylvania situation. Government objections to the offers were sustained.

Just before the court recessed and Donovan offered proof concerning Frey, the court remarked that the trial had taken a different aspect today with counsel roaring at each other in immoderate tones.

The court said it wanted no more shouting and that counsel should not try to impress the court with shouting. Instead the court wanted scholarly, learned arguments, it said.

"Conduct today is unlike what it has been," the Judge said. "It was more like aspects of a saloon brawl". Donovan was only attorney to defend his conduct. Court recessed until 9:30 a. m. Dec. 29.

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General Recession Greater Than Oil Sales Drop

N. P. N. News Bureau

WASHINGTON, Dec. 27. — Although the volume of freight of all classes moved by truck in November was 9.72 per cent under that handled in November 1936, petroleum products tonnage showed a gain of 2.5 per cent for the same period, according to monthly truck loading figures of American Trucking Assns., Inc.

The trucking body give as reasons for the slump in truck loadings "seasonal declines, labor unrest, and the drop in business activity."

November loadings of all freight were 16.94 per cent under October tonnage, while those for petroleum products were only 8 per cent below October.

Some of the Things To Do In 1938

By ARCH L. FOSTER, Technical Editor

● Why sound the death-knell of a passing year by looking backward, to see in retrospect what has been accomplished during that 12 months? We will change the angle of vision by 180 degrees, and try to see some of the problems yet remaining to be solved on the clean page of 1938. This industry has never had so many executives, so many technologists intensively at work to solve the innumerable problems we face, and never have we had so many to face as now.

Just as a check-up we mention a *few* of the main problems either unsolved or only partially solved as the New Year opens. None of them are entirely new; doubtless many will be found short of complete solution at the end of 1938. But on the solution of these, and many others of like importance hangs more than half the economic health and progress of the refining industry in the immediate future. Surveying only a part of the field, we may mention these items as among those foremost in technologists' minds:

1. Improvement of polymerization of hydrocarbons. Already operating are more than 20 polymerization plants in this country, processing for the most part gases from cracking stills, capable of producing 200 million gallons of polymerized motor fuel per year. Huge quantities of these gases are not now processed, representing an economic, almost a physical waste, actually many times that amount can be made if all available gas is processed. Polymerization must be applied to other types of process—alkylation, hydrogenation and dehydrogenation, resinification, etc.

2. Improve crude recovery methods or increase discoveries until at least the supply of new crude and of crude reserves equals our crude consumption or the current depletion of reserves. A continued reduction in crude supply or reserves will bring a crisis in the refining industry.

3. Simplify the manufacture of iso-octane, and reduce its cost therefore its market price, and promote its wider commercial use. This is a joint problem of the refiners and the engine-airplane builders. Commercial aviation companies are reported to be hesitant about buying equipment suitable for the use of this super-fuel, mainly because of its cost. We now have capacity enough to meet present needs for a time, technical executives say its cost must go down before commercial air lines will adopt it generally.

4. Sources and processes for other super-fuel companies must be found and developed or made economically practicable. I-propyl ether shows excellent properties and is being studied actively for this purpose. Heron says an iso-heptane with high octane number is potentially important. The Forward process can produce 75% substituted benzenes. The Pure polymerization process produces fuel of above 100 octane number.

5. Complete a suitable method for rating ignition quality of diesel fuels.. The CFR has "adopted" the volunteer group studying that problem and which has done such a satisfactory job, so far unaided and unsponsored.

6. Unsnarl the work of developing a good test for extreme pressure lubricants. Much of the work is already done; but many technologists are unsatisfied with the present test machine.

7. Oiliness, and its application to many special problems should be investigated with more success. The use of "oiliness" additives in many cases has progressed faster than our knowledge of the technology of their uses.

8. Prevention of corrosion of refinery equipment must progress further. Chemical and physical methods, using alkalies and alloys, have done much, pre-refinery methods, as electrical precipitation of salts, also shows good results, but more work needed.

9. Simplify the number of grades, and the specification, of refinery products. This applies especially to fuel, road and lubricating oils, and several other types.

10. Realize the controlling and ever-growing importance of research and development as the economic as well as technical life-blood of the industry. No space is large enough to bring that fact fully enough to the executive's attention.

Refining Technology

●

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Physical properties of materials change greatly at extremely high pressures. Pressures of 1½ million pounds per square inch have been attained in Armour Institute Laboratory, more than twice the highest pressure recorded previously, and these high pressures may aid in the solution of E. P. lubrication problems.

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Research at Extreme Pressures May Solve Fundamental Lubrication Problems

By Dr. THOMAS CHARLES POULTER*

ABSTRACT

● Extremely high pressures, attained in recent laboratory experiments, are deserving of interest only as they help us to solve difficult practical problems. Armour Institute recently produced pressure of 1,500,000 lbs. per square inch, more than twice the highest pressure ever recorded heretofore.

Extreme high pressures may aid us in solving difficult problems, such as lubrication of hypoid gears. Liquids change many properties under extreme pressures; water becomes solid ice, known to scientists as ice VI, many times harder than ordinary ice, and having a melting point above the boiling point of water at normal pressures. Research which applies these extreme pressures to industrial problems is being prosecuted vigorously, and may open up new fields of knowledge to the lubrication engineer especially.

THE term high pressure is a relative one which may be correctly used to represent pressures of almost any magnitude. To the man working with vacuum tubes, a pressure of one mm. of mercury is considered a high pressure; to the automobile-tire salesman a pressure of one hundred pounds per square inch is a high pressure, while the man working with hydraulic press equipment considers ten thousand pounds per square inch a high pressure.

We recently carried out a test in the High Pressure Laboratory of the Reseach Foundation of Armour Institute of Technology in which we reached a pressure of one million five hundred thousand pounds per square inch. This is the highest pressure ever produced experimentally in the laboratory. The theoretical physicist calculates that a pressure of 1×10^{10} atmospheres would be necessary to produce any marked effect upon the nucleus of the atom. The extreme to which the term high pressure may be applied is high pressure salesmanship which has no place in scientific endeavors.

This newest development in the field of research at high pressures whereby we were able to obtain a pressure of one and one-half million pounds has a real value only when these newly developed techniques are used to extend the range of our investigations beyond that possible by previous methods. For many fields of investigation, very little additional information can be obtained with one and one-half million pounds that could not be obtained at half that pressure. There are problems, however, which can never be solved experimentally, but this increase in range of pressure may clear up many puzzling questions concerning them.

I refer to the study of the interior of the earth. The pressure at the center of the earth is, of course, far beyond anything that it will be possible to obtain in the laboratory. These recent pressures do, however, correspond to those existing at a depth of between one hundred fifty and two hundred miles, whereas we were formerly restricted to pressures represented by a depth of about seventy-five miles. It has, therefore, extended the range so much as to make it of the utmost importance in attempting to answer some of the puzzling problems about the core of the earth.

It is only natural for us to consider that a pressure of one million pounds per square inch is entirely outside of the realm of processes of our everyday experience. Even though such pressures are occurring about us every day, they are, of course, confined to an extremely small space, and have a very short duration. Pressures of nearly a half-million pounds per square inch are occasionally produced in the Hypoid gear in the normal operation of an automobile, in ball-bearings, the wheel of a glass cutter, the bullet of a high-power rifle striking a solid object, and in many other cases where two very hard objects strike each other.

Such extreme liquid or gas pressures are, of course, much less common, but even gas pressures of nearly a million pounds per square inch are probably occurring every day as particles of meteoric matter traveling with a velocity of thirty miles per second collide with the very light upper layer of the earth's atmosphere.

VERY little attempt has been made in the past to utilize extreme pressure experiments in the solution of everyday problems, but they are rapidly assuming a place of increasing importance, and in such experiments lie the answers to many questions that have for years been considered impossible of solution, and such commonplace modern problem as the design of a more efficient lubricant for many purposes. The accusation commonly made by the lubrication engineer that the automobile manufacturer does not want a lubricant for the Hypoid gear of an automobile, but that he wants an anti-welding compound is used by the lubrication engineer to justify the introduction of a great variety of addition products which they themselves would not class as lubricants, but which do produce the effect required by the automobile manufacturer. The automobile manufacturer's design is in turn a result of the demands imposed upon him by the public.

*Armour Institute of Technology, Chicago.

It scarcely behooves the lubrication engineer to chide the automobile manufacturer about the so-called anti-welding compound until he is sure that the oil he is using as a base from which to compound an E. P. lubricant does not itself contain certain constituents which, when subjected to pressure, produce a part of the abrasive action which it is necessary to overcome by the addition of a so-called E. P. dope.

Anyone familiar with tests on lubricating oils is familiar with the facts that a small quantity of suspended solids in an oil is very likely to produce a bearing failure even though these particles are any one of a great many materials that may be softer than the two metals being lubricated. This effect is in part, if not largely, a result of the solid material so completely wiping off the lubricant as to permit the two metal surfaces to actually come in contact with one another to start the failure. It is the opinion of the author that most failures under conditions where an extreme pressure lubricant is required, are caused by a similar phenomenon, but that it has not been generally recognized because an examination of the oil before failure showed no such foreign particles, and after the failure, only such particles as had been removed from the metal surfaces during failure. One very likely source of suspended particles has in general been overlooked, namely those which are liquid at normal pressures, but which separate as solids under the existing pressure. In some cases these solids may be of metallic hardness.

WATER in the form on an emulsion or even the normal small amount of moisture in the oil is converted to a solid at one-third to one-fourth the pressure frequently existing under the conditions where an extreme pressure lubricant is required. The solid thus formed is known as ice VI and is very much harder than ordinary ice, and under these pressures has a melting point about as high as the normal boiling point of water.

Some of the normal constituents of certain oils may go through a similar transition, producing a substance hard enough to wipe the lubricant from the metal surfaces or even produce some abrasive action itself. Another phenomenon which has frequently been observed in our work at ultra pressures and which no doubt has its effect not only upon the wear, but upon subsequent failure, is the actual penetration of water or other compressed materials into the surface of the steel. The escape of such substances frequently causes a breakdown of the metal surface. (Ref: Thomas C. Poulter and Robert O. Wilson, Physical Review pps. 877 to 880; Vol. 40, No. 5; June 1st, 1932). If a glass rod in contact with water is subjected to such pressures and the pressure released immediately, the rod will not be affected, but if the pressure is maintained for five minutes so as to allow time for the water to penetrate the surface of the glass, and then the pressure is released, the rod will be broken up into discs; whereas, if the pressure is maintained for twenty minutes permitting the water to penetrate deeply into the glass, then released rapidly, the glass will be shattered into small pieces. Similar effects, although to a much lesser degree, are known for steel and other metals.

With the increasing realization that pressures of as high as a half-million pounds per square inch exist between two metal surfaces which are supposed to be kept separated by means of a lubricant, has lead to an entirely different conception of the problem. Extreme pressure lubrication is only in its infancy, and a proper method of approach to a fundamental understanding of the problem is through research at extreme pressures.

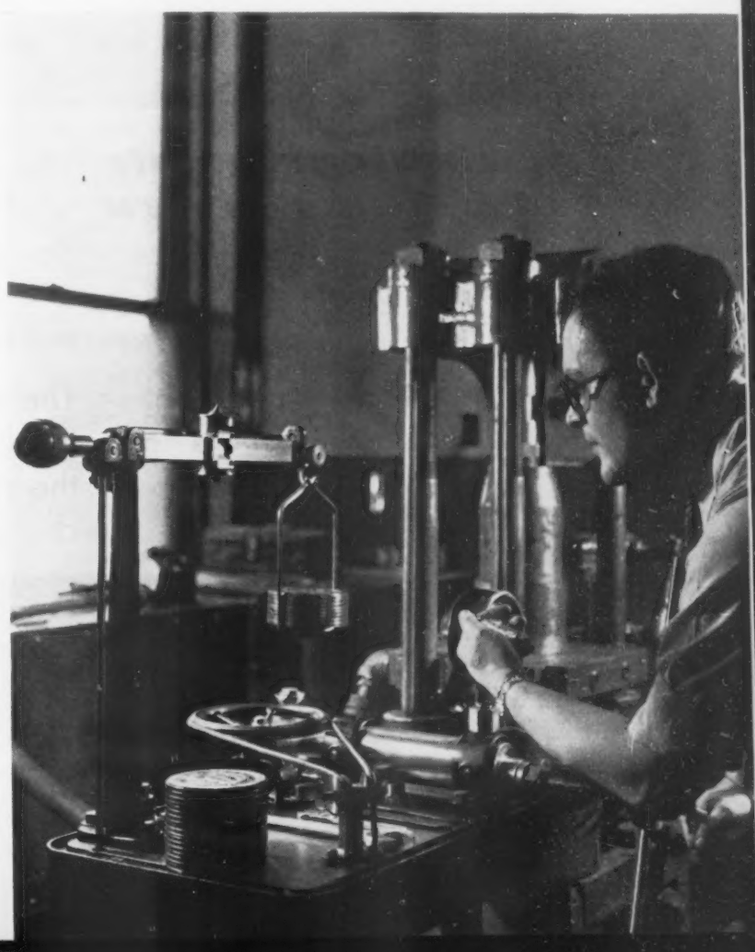
Suppose we put a lubricating oil under such a pressure, and study its physical properties. We find that the no longer a fluid in the normal sense of the term, but that it has in some cases become quite hard. It is indeed fortunate that this is true, for if such were not the case it would be impossible to maintain a film of lubricant between many of the operating parts of a modern automobile.

The viscosity of a liquid at normal atmospheric pressure is no indication of what its viscosity or hardness may be at greatly elevated pressures. Two liquids having almost identical physical properties at one pressure, may vary by several thousand fold at another pressure well within the range of those normally encountered in extreme pressure lubrication problems. The effects of pressure upon the physical properties of various liquids differs so widely as to make it possible to produce a mixture of almost any desired viscosity or hardness at almost any specified pressure.

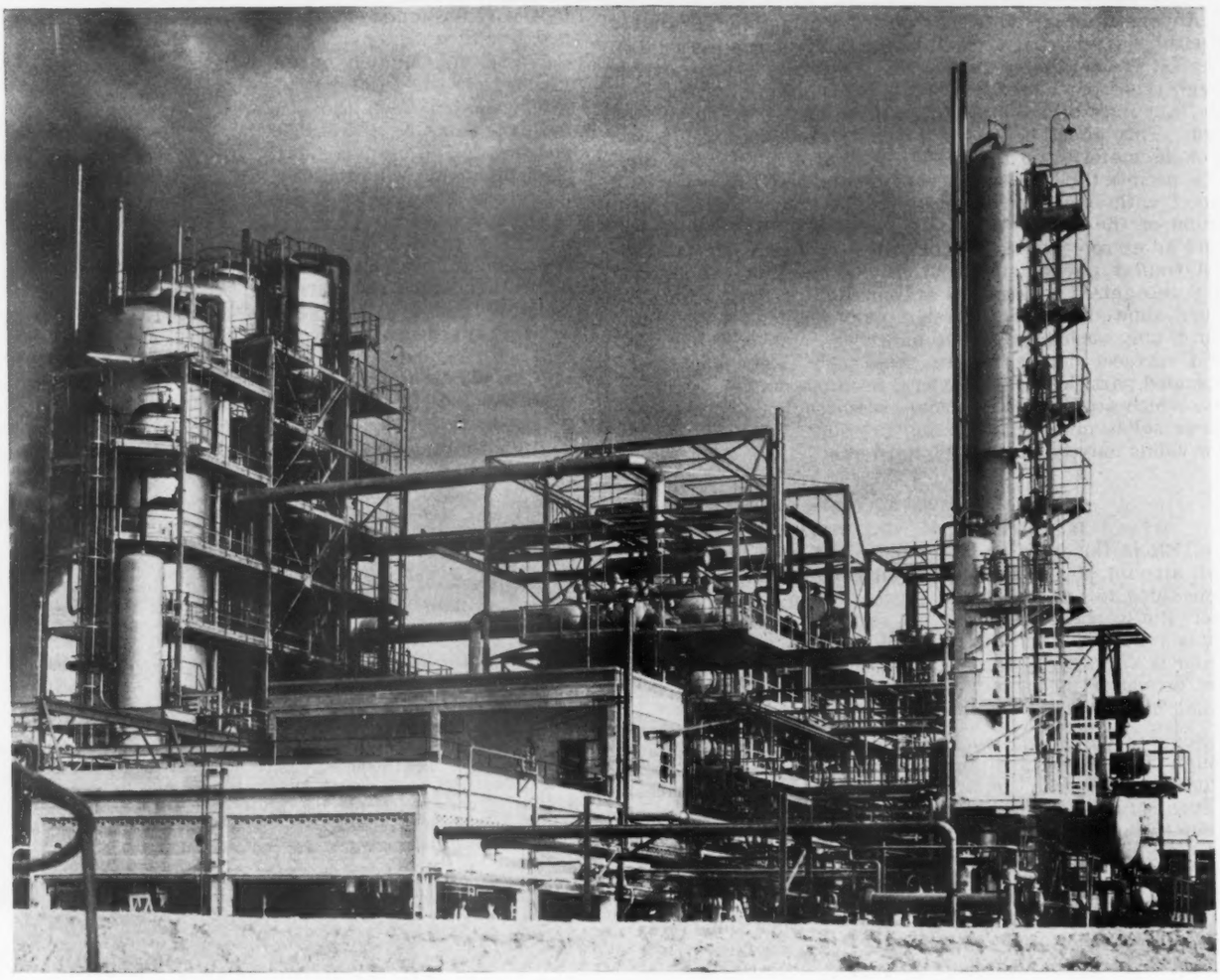
It is the opinion of the author that the day is not far distant when the specifications of a lubricant will be largely based upon the pressure-hardness curves for not only the mixture as a whole, but upon the individual constituents. This is particularly true in view of the modern conception that a lubricant is a fluid without harmful properties which serves as a carrier for a very small quantity of material which produces a lubricating action. The proper hardness curves can be theoretically determined from the condition under which the oil is intended to operate, taking into account the hardness and curvature of the two surfaces, the rate of motion of the contact point with respect to these two surfaces the rate of motion of one surface with respect to the other, and other conditions affecting the plastic flow of the lubricant. With these specifications available, it will be possible for the lubrication engineer to design a lubricant which will have the physical characteristics necessary for it to serve as a lubricant in the true sense of the word, and which will prevent abrasion of the two metal surfaces.

It was the development of a new steel that permitted the production of an automobile requiring an E. P. lubricant. One has but to consider the present trends in the development of alloy steels to realize that the time is already at hand when an E. P. lubricant of a still higher order of magnitude is required.

Pressures of 1,500,000 pounds per square inch were recently developed in this pressure equipment in the Research Foundation of Armour Institute of Technology. This is the highest pressure ever produced experimentally in the laboratory, and exceeds all previous records by more than three quarters of a million pounds per square inch. This corresponds to the pressure that would be developed at the base of a layer of limestone more than one hundred and sixty miles thick



Flexibility Of Operation



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"State of the Art" AS SEEN IN THE WORLD'S CURRENT TECHNICAL LITERATURE

By M. G. VAN VOORHIS

Polymerization of Ethylene

Metallic aluminum changes reactions during polymerization of ethylene by aluminum chloride. F. C. Hall and A. W. Nash, Jour. Inst. Pet. Tech., Nov., 1937.

Formation of reactive ethyl derivatives of aluminum through polymerization of ethylene by aluminum chloride is described for the first time. Under suitable conditions of temperature a high yield of a reactive organo-metallic compound of aluminum is obtained. By reaction with sodium chloride, formation of a double compound is observed and the analysis of the residual liquid corresponds closely with that of aluminum diethyl chloride.

Catalytic polymerization of ethylene under pressure at 300° C. (572° F.) with this compound produced ethylene homologues of relatively simple constitution, which is in accordance with the reaction mechanism proposed by Taylor and Jones* for the polymerization of ethylene by free ethyl radicles.

During a study of the polymerization of ethylene under pressure by aluminum chloride it was found that in the presence of metallic aluminum the character of the reaction could be altered completely. At 100-200° C. the period of activity of the catalyst was relatively short. The product was a mobile fuming liquid. This is in contrast to the product obtained by polymerization using aluminum chloride alone, which is an oil and an insoluble pasty or carbonaceous complex of aluminum chloride and unsaturated hydrocarbons.

The mechanism of the reaction by which these ethyl derivatives of aluminum are formed is not known. Polymerized hydrocarbons formed during the reaction have a hydrogen deficiency more than sufficient to account for the production of the (C_2H_5) groupings from the initial (C_2H_4) molecules. It is probable that these are formed by intermolecular hydrogenation of an unstable transient complex between the ethylene and aluminum chloride, in the presence of metallic aluminum, by hydrogen liberated at the expense of the polymerized hydrocarbons formed. It is significant that the reaction proceeds at temperatures at which, in the normal polymerization of ethylene by aluminum chloride, quantities of paraffin hydrocarbons are formed.

*J. A. C. S., 52 (1930) 1111.

* * *

Refining Trends

High octane demand affects trend in cracking unit design. World Petroleum, Oct., 1937, *p.* 82.

The effect of a demand for increased octane value gasoline in the past two or three years has been installation of cracking units with separate reforming coils, light and heavy gas oil cracking coils, and with separate visbreaking coils. This trend is closely associated with increased gas production which is being taken care of by the development of polymerization.

The new combination of producing chemical intermediates such as ethylene, propylene, and butylene, along with aromatics by pyrolysis and by polymerization with the cracking operations as previously carried on in refineries, has resulted in a broadened horizon for all refiners. They can now go the limit on raising temperatures of cracking and not be penalized in earnings. Fuel oil, of course, will be one of the final products.

This combination, along with changing markets and the price structure of salable products is rapidly changing refiners' minds as to the desirability of changing their cracking operations from fuel oil operation to coking operations. It appears now that running to coke in cracking operations will show more profits than running to fuel oil. This is indicated in spite of increased knowledge of hydrogenation. This is unfortunate in view of the abundance of solid fuel resources. A simplified and cheapened hydrogenation process would lengthen the life of oil deposits and every technologist's mind should be turned in that direction until the goal is reached.

Manufacture of higher octane fuels has called for gas and distillate stabilization plants, designed to finer tolerances both as to process and to mechanics than have been known before.

* * *

Dewaxing Dopes

High oil retention of waxes is prevented with the aid of wax conditioners. E. C. H. Kolvoort, F. R. Moser and C. G. Verver, Meeting of Inst. Pet. Tech., London, Nov. 9, 1937.

Occurrence of branched-chain paraffins together with those of normal type is believed to be responsible for bad filterability and high oil retention in the higher boiling fractions of some crude oils. Certain types of wax appear to have a tendency to absorb oil. Use of substances known as wax conditioners counteracts this tendency. The action probably is the same as that of well-known pour-point depressors (such as Paraflow) and some substances are found suitable for both purposes.

Substances may be classified in three groups. One includes synthetically produced organic chemicals of more or less definite structure such as Paraflow (a Friedel-Crafts condensation product of naphthalene and chlorinated paraffin wax) and compounds such as octastearyl-saccharose, rufigallic acid hexastearate, etc. Another consists of dark-colored bodies of undefined structure, pyrogenically formed in the process of cracking a hydrocarbon or fatty oil. The third are soaps of polyvalent metals.

Substances of the first group are suitable for pour-point depressors but are too costly for dewaxing dopes. The second group is more important in this realm. The active properties are concentrated in the so-called asphaltenes, but only those formed in cracking operations. Their efficiency is largely a problem of colloid-chemical nature and their potency is gradually lost owing to coagulation of active bodies. Regeneration may be accomplished by heating. A disadvantage of the pyrogenic group is their inclusion of inactive substances which color the filtrate. This discoloration is generally not removable by clay but very readily by a slight acid treatment.

Among the soaps in the third group aluminum stearate is the most important. No soaps derived from high molecular acid other than the saturated fatty acid (stearic and palmitic) such as oleic, ricinolic, lauric, and various naphthenic acids, have any activity.

It is believed that the dewaxing dopes are substances of

polar character possessing affinity for the surface of a crystal of paraffin wax. If a solution crystallizes out in the absence of such an active body, a considerable number of crystal nuclei are formed, each of which grows up to an individual crystal, each carrying a "shell" of oil which may "gel" the particles together.

In the presence of a suitable active body, the greater part of the wax nuclei will be coated with this active substance immediately on formation. Crystallization will take place on only a few nuclei which have escaped this action. The result is the formation of a few relatively large crystal aggregates. The active material is removed by filtration unless there is a surplus in which case it passes through and acts as a pour-point depressor.

This hypothesis explains why a pour-point depressor has little or no action on the pour point of certain waxy distillates. The main cause of pour-point depression is probably the loosening of adsorbed oil. Distillates containing wax of a non-retaining type will be affected but little, if at all.

The presence of active bodies of this nature needs careful watching in all dewaxing experiments. Distillates may contain traces of natural dopes as a result of slight cracking or entrainment during distillation. The removal of a high-boiling solvent, if done carelessly, may introduce a pour-point depressor after dewaxing. It is desirable, therefore, to give the material an earth treatment both before and after dewaxing.

* * *

Boiler Water Treatment

Order is emerging from the chaos of conditions and compositions causing steel in contact with boiler water to crock. Bureau of Mines Information Circular I. C. 6974.

Complications have been found in the problem of cracking of steel by boiler water following important discoveries of the Bureau of Mines in 1935 and 1936. Study has revealed that not one or two solutions or mixtures such as sodium hydroxide and sodium silicate produced cracking but that a whole series were capable of producing the same result.

Intercrystalline cracking has been produced by small quantities of potassium permanganate, sodium nitrate, sodium chromate, lead oxide, sodium silicate, titanium oxide, germanium oxide, and antimony tri-chloride in concentrated sodium hydroxide solutions boiling under the atmospheric pressure at 250° C. Other substances may be substituted for sodium hydroxide as well as, for example, a sodium nitrate-manganese chloride solution.

A theory has been developed which correlates the known facts fairly well. The mechanism involves formation of a protective layer on the steel which is not continuous enough to prevent the solution from attacking the grain boundaries. Reactions may be started or stopped by surface conditions on the steel and are extremely sensitive to small changes. Since temperature and solution conditions must be accurately adjusted to produce cracking, it may occur only intermittently in a boiler. Substances which prevent cracking do so by changing or producing a new surface film. Results show definitely that it is not necessary to have an applied load to produce cracking nor do repeated stress and corrosion fatigue necessarily play a part in the production of this type of failure.

One or two inorganic chemicals have been found to offer some protection against embrittlement, but two groups of organic chemicals are much more effective. These compounds are very low in cost. Investigation is being continued to make additional tests of inhibiting compounds and study the "mechanism" of the action of dilute solutions in the production of cracks. If a chemical can be found that produces a continuous nonpolar layer, it should offer the most satisfactory and least vulnerable means of protection.

* * *

Still Tube Life

Improved creep test technique now yields reliable data on life of still tubes. E. C. Wright, World Pet., Oct., 1937, *p.* 160.

The change of structure in steel in refining equipment has now been completely verified in long time creep tests. It has been found that creep test specimens under stress at high temperature for a long period undergo the same structural transformations which occur in service.

More important, it has been found that the high temperature rigidity of steel decreases as the structural changes take place. Therefore, a creep test made on a specimen of steel which has the so-called normalized structure will often yield a higher result than if the creep test specimen had been placed in a structural state which finally develops after long periods at high temperatures. Short-time creep tests may be misleading because the creep rate varies with service.

Tests conducted at 1000° F. on a low carbon steel have indicated a limiting creep load for 0.1 per cent stretch per 1000 hours as high as 6000 pounds per square inch, particularly when the test is not extended beyond 500 hours. The same steel, heated to 1300° F. for long periods before testing, has shown a limiting creep load as low as 4200 pounds per square inch for 0.1% stretch per 1000 hours at 1000° F. Creep test specimens should be placed in a structural condition similar to that developed in service in order that the limiting strength of the material after long service may be more accurately estimated.

Carbon steels which have been treated in the ladle with deoxidizing agents have a higher creep resistance than untreated steel. This distinction is not met in alloy steels.

The question of how long a tube having ½-inch walls will last which has corroded to ⅜ inch is a matter of creep rate. For example, if a tube were designed to carry a load of 1% in 10,000 hours without corrosion, then, after corrosion it could operate only either at a lower stress level or for a much shorter time. Charts have been prepared for various types steels to show the number of hours of life to expect under certain conditions of stress and temperature.

At Pt. Arthur, Texas, this furfural refining unit for solvent extracting lubricating fractions has been installed by The Texas Co. In predominantly agricultural region, this unit utilizes a farm product for the production of 20th century lubricating oils. Photo by Robert Yarnall Ritchie; courtesy The Texas Co.

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Oil-Film Lubrication; An Answer To Camelford-Burwell Discussion

By Ir. G. LIETH

IN AN issue of NATIONAL PETROLEUM NEWS of February 24, 1937, the writer found an interesting paper by Messrs. A. W. Burwell and J. A. Camelford entitled "Three Phases in which lubricants may operate" whereby the authors ask in the last paragraphs to discuss and criticise the communications they made on this subject.

The writer will try to give an explanation of his interpretation of the phenomena described by the curves which Burwell and Camelford have given and to which is referred as Fig. 1 and 2, whereas the illustration which the writer gives hereunder are numerated progressively 3 and 4.

The conclusion to which the writer has come by observing other similar curves and which conclusion he wishes to prove by the following arguments, is that:

All three phases can be obtained in certain cases by pure fluid film lubrication, following the hydrodynamic laws of friction.

We have to go back to the marvelous mathematical analyses of fluid film lubrication in full and half lubricated bearings as given by Prof. Sommerfeld, the well-known physician, who at present occupies himself no more with this engineering problem, but investigates the unknown territories of the atom in Munchen, Germany. Prof. Sommerfeld has given his analyses of lubrication of bearings way back in 1904, but his theory is practically never applied by other investigators. Yet the world famous A. G. M. Michell has invented his thrust bearing after Prof. Sommerfeld had given his simple mathematical analyses and Mr. Michell refers in a paper about the theories of his bearing to this theory of Sommerfeld as being the simplification of the theory of Osborne Reynolds.

This introduction the writer feels obliged to give to Prof. Sommerfeld and will omit the arguments which can be given why this theory has been forgotten in Germany due to the work of Prof. Guembel and Herrn Falz, who have not given the right credit to Prof. Sommerfeld's work. Sometimes in French and American literature the name of Prof. Sommerfeld has been mentioned and I hope that the analyses I give here will make the work of this man better appreciated by all investigators on the subject of lubrication.

In order to simplify my paper I have to quote some of the principal ideas of Prof. Sommerfeld and take the instance of a bearing which is lubricated over the whole of its circumference i. e. a full lubricated bearing with a "wet" surface of 360 degrees.

Fig. 3 gives a shaft surrounded by such a bearing and the centre of the shaft is—under a certain load and speed—out of the centre of the bearing. This we call the eccentricity *e.* of the shaft. The difference in the radius of the shaft and the bearing shell is called *d,* and the

FIG. 1

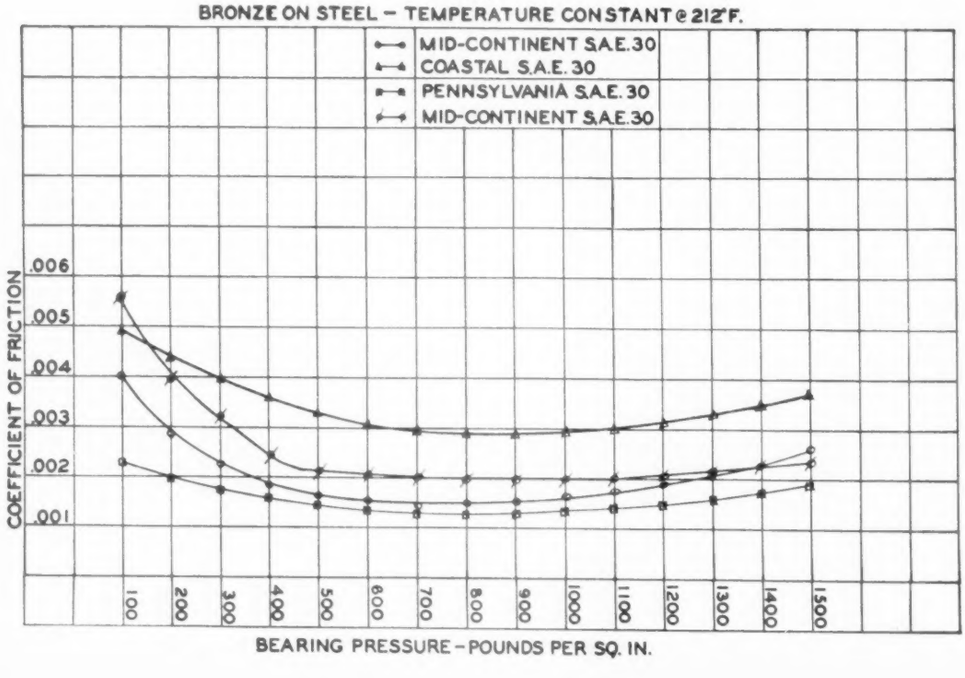

Fig. 1. These curves are those shown as Fig. 1 in the Camelford-Burwell paper published in these pages Feb. 24, 1937, page 90, and captioned, "Coefficient of friction-pressure curves, showing the lubricants operating in two phases, first the full fluid film and next the 'adsorbed film' phases." These curves are reproduced here for the convenience of the reader in following the discussion in the accompanying article

FIG. 2

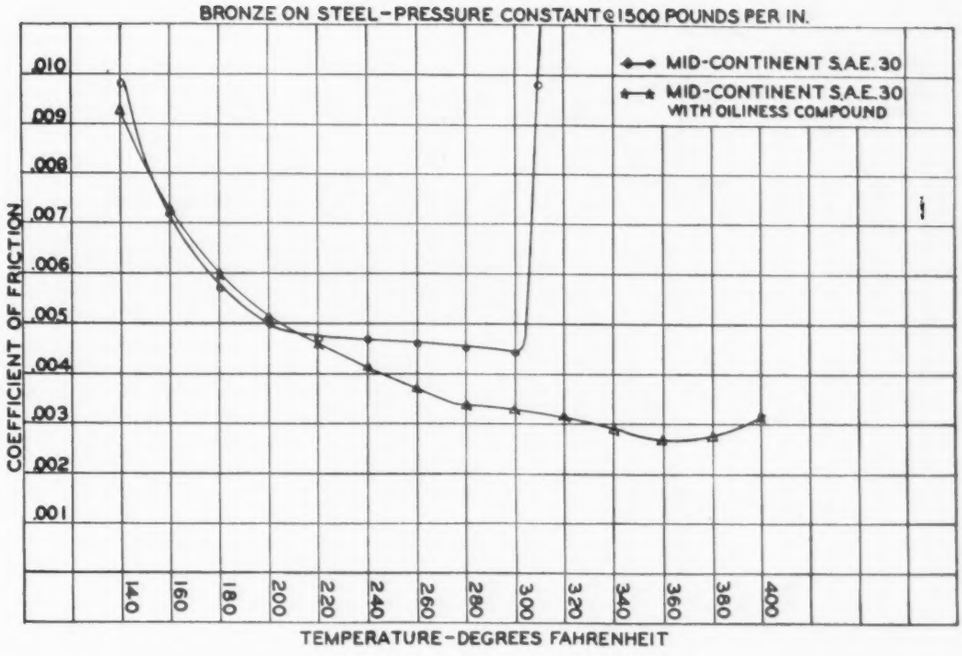

Fig. 2. Curves shown in Fig. 2 of the Camelford-Burwell article, and captioned, "Coefficient of friction-pressure curves of a straight mineral oil, and the same oil to which an 'oiliness' compound has been added. Note that the pure mineral oil reaches a temperature at which the coefficient of friction rapidly approaches infinity, this is, seizure, while the compounded oil continues indefinitely in the 'adsorbed film phase' or boundary phase, without failure"

ratio d/e is called by Sommerfeld a factor a, which changes according to a mathematical equation which will be omitted here. It is easier to have the ratio d/e reversed, as other investigators do, and take the ratio 1/a or e/d which makes Sommerfeld's curves from infinitely long, very short and easier to understand. Let us call this ratio e/d, the *specific eccentricity*.

The base of the graph, Fig. 4 gives this ratio from 0 to 1. A specific eccentricity of 0 means thus that the eccentricity is zero or the centre of the shaft is rotating in the centre of the bearing shell. A specific eccentricity of 1 means therefore that in some place we will find metal-to-metal contact.

The load, P, the circumferential speed of the shaft V, the radius of the shaft and the viscosity of the oil in the same dimensions as load and speed (as kg. sec./sq. m., when the load is in kg/m shaft length and V is in m/sec.) are, next to half the bearing clearance in meters, the Characteristic Work Factors, influencing the specific eccentricity of the shaft. The mathematical equation, is omitted, but the curve which gives this mathematical equation is given in Fig. 4. The Characteristic Work Factor is denoted by Sommerfeld by a Greek B., but for easier reference we will call this W.

$$\text{(curve I, Fig. 4)}\quad W = \frac{d^2.\,P.}{6.\,u.\,r^2.\,V.}$$

herein u is the kinematic viscosity of the oil in use.

In the same figure we give a curve II representing the ratio by which the so-called Characteristic Friction, F, changes with the specific eccentricity of the shaft.

This Characteristic Friction is according to Sommerfeld a factor which consists of the friction co-efficient, multiplied with the radius and divided by half the clearance.

$$\text{(curve II, Fig. 4)}\quad F = \frac{f.\,r.}{d.}$$

For a certain fixed value of $\frac{r}{d}$, F is thus proportional to the co-efficient of friction for the whole curve.

When we compare the curve of F, we find, between points *a* and *b*., a curve of form similar to the curve given by Burwell and Camelford (see Fig. 1). A certain drop of the factor, F, can be found to a certain minimum and after this minimum we find a slight increase up to the specific eccentricity 1, which means metal-to-metal contact. Yet this increase in the F curve is still following the mathematical fluid film lubrication laws. The *minimum F. is always the same for every bearing and any oil*, and so, notwithstanding the writer does not know which speed, nor which oil Burwell and Camelford have used in their tests, as only the load and the friction co-efficient have been mentioned, the writer can predict that the value of d/r for the test of Burwell and Camelford represented in the top curve of Fig. 1 must have been

$$\frac{0.0029}{0.943} = 0.00307,$$

in case they have used also a full lubricated bearing with wet surface of 360 degrees.

As already stated, the writer does not know any load factor nor any measure of the radius and the clearance of the bearing used, but the ratio of radius of the shaft and half the clearance of the bearing, or in other words the ratio of diameter of shaft and total clearance must be 0.00307 for the top curve. For the other curves we find respectively d/r = .00212, 0.0016 and 0.00138.

All this is true whenever the exact conditions of Sommerfeld for integration of his basic principles has been met by the investigators. These conditions are quite easy to satisfy. They are the following:

a. The oil used must be incompressible.

b. The speed of the oil in the bearing may not exceed the critical speed of Reynold.

c. The space between shaft and bearing must be completely filled up with oil. This can be met when the oil is applied at the right place and with the right pressure. (It would take more space than necessary to consider this condition from an engineering and laboratory standpoint).

d. The bearing must be infinitely long, or in other words, loss of oil at the ends must be prevented. (The axial velocity of the oil must be zero). The above made statement of the ratio d/r is independent of this condition as will be seen from the following.

e. The shaft and the bearing must be absolutely cylindrical. (This condition has not much influence on the outcome, unless oil grooves are made in the test bearings).

Now that the writer has analyzed the ratio d/r. for the test under review, he wishes to see if the Characteristic Work Factor W for the test can be found. This work factor W must be in line with the minimum friction and therefore must be for a completely lubricated bearing

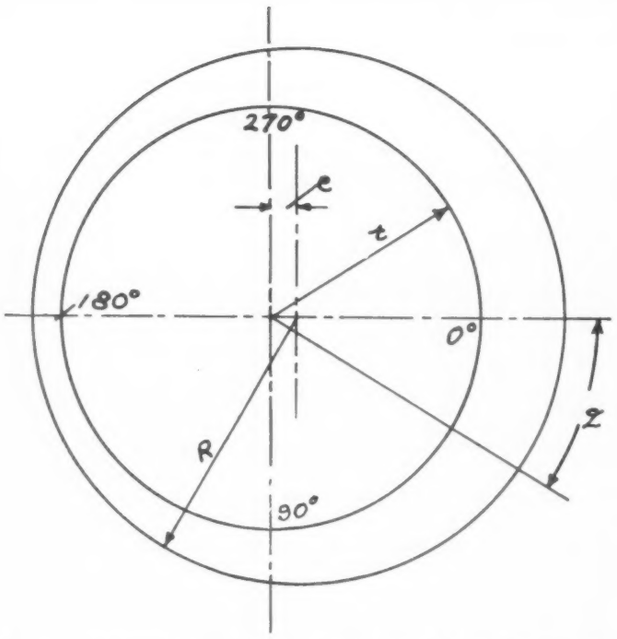

Fig. 3. Diagrammatic representation of a bearing in a shaft, and identifying the factors used in the accompanying equation and discussion

equal to 2.55. At this critical point we find from Fig. 1, top curve, a load of 800 or 900 lbs./sq. inch. If we assume that it is 900 lbs./sq. inch then it is approx. 63.5 kg./sq. cm., which means 63.5 times 2r. times 100 kg./m shaft length. For V, the circumferential velocity of the shaft we can write $2\pi rn/100$ m./sec., if the radius of the shaft is in cm. and n = number of revolutions per second. If we substitute these values in the equation given for the Work Factor, W, we find, because we know already the ratio d/r is 0.00307:

$$nxu = \frac{0.00307^2 \times 12700. \times 100}{6 \times 2.55 \times 2 \times \pi} = 0.125 \text{ kg./sq. m.}$$

This figure can be checked by Messrs. Burwell and Camelford, but they might find a difference, due to oil loss at the side ends of the bearings. The kinematic viscosity of the oil they used must be taken at a temperature somewhat higher than they have given in Fig. 1 being 212° F. It is a well known fact that the temperature of the oil in a bearing is not the same on all spots and differs sometimes 50° F. over the average temperature of the bearing.

The loss of oil at the ends of the bearings can be taken care of by considering the following.

The equation given by Sommerfeld for his Characteristic Work Factor is understood for an infinitely long bearing. As soon as the oil is lost at the side ends it is easy to understand that the eccentricity of the shaft of the bearing will become greater, therefore the Work Factor has to be multiplied by a certain factor k, which I have found to be, from work of other investigators, between 1 and 1.6.

According to this consideration the value of *n x u* given above for a temperature of appr. 260° F. must be between 0.125 and .20 kg./sq. m. For n, in number of revolutions per minute this value becomes 60 x .125 or 60 × .20 = 7.5 to 12.—

If the above calculated values really check with the data of Burwell and Camelford it will be another proof that the theory of Sommerfeld can be applied to practical engineering work. The formulas of Sommerfeld can be cast in other, more convenient forms for the engineer. I will not give these here in this paper.

The second figure of Burwell and Camelford is more difficult to explain and yet also the behaviour of both oils can be explained from *pure fluid film lubrication*. The difficulty lies in the fact that the second curve of the Mid-Continent oil with an oiliness compound makes it rather easy to assume that the further drop in the friction curve is due to the compound, and yet other tests with pure mineral oils have given similar curves as the curve with the compound. Again in Fig. 2 the data are not sufficient to check every item as for instance the speed and clearance of the bearing have been omitted. It is a pity that most investigators leave the data of the clearance out, and this cannot be understood, the more because the clearance is one of the most important items to be considered in any engineering lubricating problem. It is even so important that this item is responsible for many failures in correlating test results of several investigators and finding one mathematical formula for lubrication of bearings. The writer will try to explain in short what can have happened in the tests of Fig. 2.

One way or the other, the oil has been heated or the shaft has been heated or the bearing has been heated by outside means or the supply of lubricating oil has not been adequate enough to properly cool off the bearing. The curves show us anyhow that the oil is working gradually under higher temperatures than usual.

What happened to the clearance of the bearing under such heated conditions? As soon as the bearing shell cannot expand anymore to the outside it will expand inwards; it will try to squeeze the shaft, a phenomenon usually happening with hot boxes and always met by the engineer by loosening the bearing shell. The shaft is expanding anyhow when there is no proper cooling, which the writer understands takes place more frequently in a laboratory test than in practice. It can be understood that the clearance will become smaller and smaller under the heated conditions which have been shown in Fig. 2. Taking this for granted the Work Factor for this test, which might have been in the first part of the test up to the critical value of 2.55, will drop, due to the fact that the ratio d/r drops with the square. Let us assume that d/r drops 30%, then the Work Factor, W, will drop about 50% and will become approx. 1.27 when we assume also that the kinematic viscosity has not been falling off. Now this usually happens too and this drop of viscosity is depending entirely on the viscosity index of the oil used. A drop in viscosity of the oil will increase again the work factor and partly offset the decrease caused by the smaller clearance. Assuming that W has dropped in total from 2.55 to 2.00 then the Characteristic Friction, F, will have increased from the minimum of 0.943 to approx. 1.05, but the friction co-efficient must have decreased then too. In fact, in order to obtain a value of F of 1.05 with a decreased ratio d/r we must find a co-efficient of friction which has also decreased.

In case of the above taken assumption of drop in the ratio of d/r with 30% and an increase of F. with approx. 10% we must have a decrease in the friction co-efficient of 33% below the original minimum. So there is a fluid film present preventing metal-to-metal contact which happens as long as the Work Factor W is quite low and around 2.5. Now we can also imagine that the heating of the bearing and shaft becomes so high that the Work Factor becomes as low as 0.5, then the characteristic friction F. becomes so much higher that the real friction co-efficient cannot decrease but must increase, not withstanding d/r has decreased. In that case the temperature of the bearing increases more and more and suddenly the clearance of the bearing is zero which means that the shaft seizes in the bearing. Such a hotbox can happen therefore with an oil that is still cool and does not increase the work factor in the same degree as the decrease of the clearance does, due to the expansion of the bearing and shaft developed by the heat. In such a case it will therefore be better to cure such a hotbox by cooling the bearing and/or shaft with water from the outside rather than by cooling the bearing by adding fresh oil. Several times we find in our engineering practice that adding fresh oil does not help to cure a hot bearing, but adding oil of another character does help. In the case of Fig. 2 we must assume therefore that the compounded oil has another viscosity curve at the high temperatures than the pure mineral oil.

This explanation of a hotbox is not the only one. It might be that a bearing is rather cool but that an oil is used with a very steep viscosity curve. We then see that

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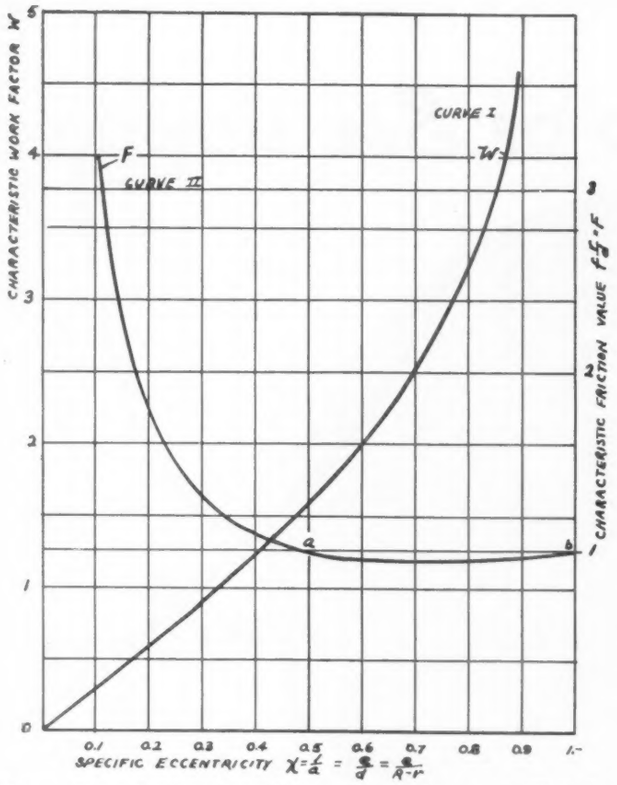


Fig. 4. Curves showing relationship between the Characteristic Work Factor, W, and the Specific Eccentricity, e/d, and characteristic friction factor in lubrication

as soon as the oil is heated up by the high friction at the time that the work factor is low, due to the high starting viscosity of the oil, the work factor quite suddenly increases up to a figure of around 5 or 6, due to the sudden drop in viscosity of the low-index oil. In that case the specific eccentricity of the shaft becomes so high that any increase in the load due to shocks, or any drop in the speed of the shaft, makes metal-to-metal contact and consequently gives further increase of friction.

One point remains unanswered. Why do we find different minima in the friction co-efficient given in Fig. 1 for each different Oil?

Sommerfeld's F, and consequently with a fixed ratio $\frac{d}{r}$, the minimum friction co-efficient must be independent of the viscosity of the oil. The viscosity of the oil only regulates the Work Factor, W, and consequently only the specific eccentricity. Mathematically the minimum co-efficient of friction in a certain bearing happens only at a certain fixed specific eccentricity, i. e. for a full lubricated bearing at e being 0.63.

The writer therefore asks Messrs. Burwell and Camelford to give complete data about the following:

a. In which sequence have the curves of Fig. 1 been produced?

b. Is the clearance in all tests exactly the same, especially compared with the radius of the shaft?

A bearing which has been run in, gives usually a somewhat larger clearance, so that the writer assumes that in Fig. 1 the curve with the lowest figures has been produced first and consequently the higher curves have been produced.

A practical engineering formula for the viscosity of an oil for a certain work, taking into consideration that a work factor of 1.61 is a safe factor giving a specific eccentricity of 0.5 for the shaft, has been worked out by the writer and reads:

Degr. Engler at appr. working temp. of the bearing

$$u_E = \frac{740.\ pm}{n.\ r^2} \times c^2 \times k + E$$

In this formula:

pm = the average load per sq. cm.

n = the number of revolutions per min.

c = a correcting factor for clearances divided by .1 mm (.004").

k = a correcting factor for oil loss at the side ends, and having an average value of 1 to 1.5.

E = a correction factor for expressing the kinematic viscosity in degrees Engler.

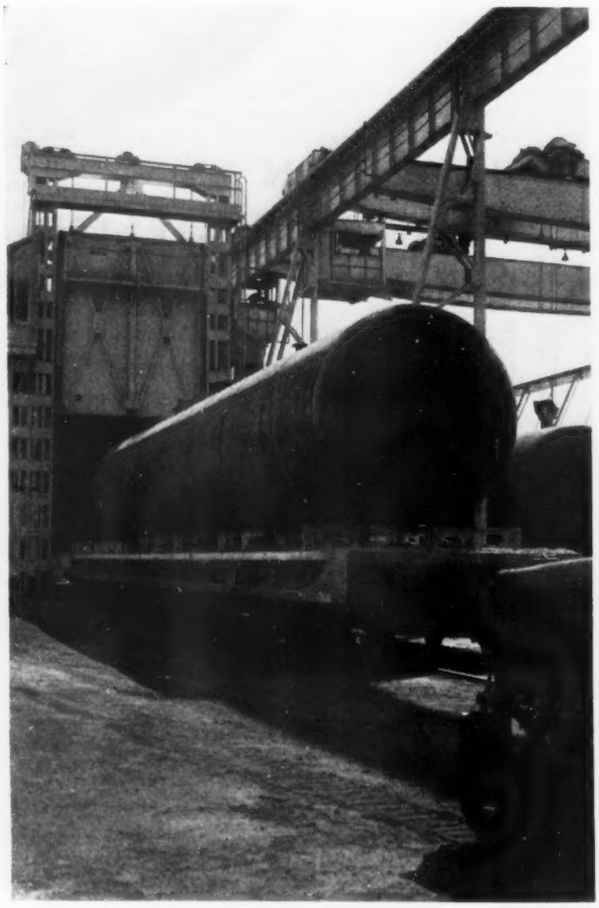
r = radius of shaft in cm.

Other practical formulas can be made from the basic equations of Sommerfeld, for instance for half lubricated bearings and for the heat generated in the bearings due to friction and the consequent loss in H.P. This is out of the scope of this paper.

The aim of this paper was to give a check on the phenomenon of the three phases of lubrication, which has been suggested by Burwell and Camelford, with hydrodynamic theories. An answer to this will be very much appreciated by the author.

Awarded Medal

The Samuel Wylie Miller medal, an annual award of the American Welding Society presented for meritorious contributions to the science and art of welding, has been awarded to H. Sidney Smith, consulting engineer for Union Carbide & Carbon Co. The recipient has had many years' experience in acetylene welding, has made many important contributions to it, and has written many articles on its uses. In numerous associations he has served in important executive capacities.



One of two propane tanks fabricated by Chicago Bridge and Iron Co. at its Birmingham plant for installation at a Cleveland refinery. The tank is 63 feet 8 inches long and 8 feet 10 inches in diameter

Patent Literature OF TODAY

Cracking. No. 2 093 278, *issued Sept.* 14, 1937; *filed Oct.* 5, 1933; *P. C. Keith, Jr., assignor to Gasoline Products Co.; one drawing;* 3 *claims.*

An object is to provide a plural section cracking unit, one section of which is adapted to make a clean charging stock for cracking in another section from a heavy or dirty charging stock.

Condensate oil is cracked and resultant vapors separated from liquid residue. Vapors are fractionated to separate out a desired light distillate and a heavier reflux condensate which is passed to the cracking zone. Liquid residue from the separating zone is flashed at lower pressure to separate residue and vapors. These vapors are passed to a primary fractionating zone into which crude residuum is introduced to cause partial condensation of vapors and partial vaporization of the charging stock.

Unvaporized portions of the charging stock are withdrawn with resultant condensate from the primary fractionating zone and separately cracked. Resultant products are flashed to separate vapors and residue and the vapors are further fractionated in the primary fractionating zone to separate out reflux condensate which is combined with the aforesaid condensate passing to the first-mentioned cracking zone.

* * *

Cracking. No. 2 093 473, *issued Sept.* 21, 1937; *filed Aug.* 26, 1936; *E. A. Ocon; one drawing;* 19 *claims.*

The main object is provision of a method of treating in a primary blending, vaporizing and fractionating tower with highly heated cracked products and steam, streams of high boiling point hydrocarbon materials to form two streams of purified fractions, each of different composition and characteristics and being adapted for subsequent cracking separately.

One stream consisted of vaporized fractions of higher boiling point than gasoline blended with the cracked hydrocarbon vapors of higher boiling point than gasoline of the highly heated hydrocarbon products which are condensed. The unvaporized portion of the uncracked charging stock mixed with entrained liquid of the cracked products forms the second stream.

Another object is to provide a composite method of producing sulfur treated synthetic recycling stock consisting of a mixture of heavy fractions of different composition and characteristics.

* * *

Cracking. No. 2 093 588, *issued Sept.* 21, 1937; *filed July* 21, 1926; *L. D. Forward, assignor to Forward Process Co.;* 6 *drawings;* 14 *claims.*

In the cracking process in which cracked products are discharged into an enlarged zone and vapors discharged therefrom through a vapor outlet, cooling fluid is introduced directly into the vapors as they enter the vapor outlet in such a manner that vapors and cooling fluid flow concurrently into the outlet.

This means of sudden cooling is said to entirely prevent deposition of carbon during the preliminary cooling operation, thereby avoiding fouling of apparatus and cessation of operation.

* * *

Lubricant. No. 2 094 202, *issued Sept.* 28, 1937; *filed Feb.* 4, 1935; *H. T. Bennett and C. Prather, assignors to Mid-Continent Petroleum Corp.; no drawing;* 9 *claims.*

A lubricant is comprised of more than 80% mineral oil, 0.1 to 5% diphenyl, and 1 to 15% of saponifiable oil in the group of animal and vegetable oils containing an element in the group of sulfur, chlorine and phosphorus.

Diesel fuel. No. 2 093 008, *issued Sept.* 14, 1937; *filed June* 20, 1935; *A. C. G. Egerton;* 2 *drawings;* 2 *claims.*

A small proportion of a dialkyl peroxide is added to a diesel fuel to lower the spontaneous ignition temperature and shorten the delay period of ignition similar to diethyl peroxide. The two alkyl groups are united solely by the peroxide oxygen atoms.

* * *

Combination unit. No. 2 097 412, *issued Oct.* 26, 1937; *filed Feb.* 1, 1935; *J. J. Hogan, assignor to Standard Oil Co. (Ind.); one drawing;* 6 *claims.*

Raw crude is distilled to separate a light virgin naphtha, a heavy virgin naphtha which is reformed to improved anti-knock properties, a light gas oil fraction which is cracked to convert to motor fuel constituents, and a topped crude. Products from reforming treatment and cracking are separated into vapors and residual products in a common zone. The vapor is fractionated to separate a heavy gas oil condensate, a light gas oil condensate, and a distillate product.

The improvement comprises a viscosity breaking treatment for the topped crude, removing lower boiling constituents including a light gas oil from the remainder of the products resulting from the viscosity breaking treatment, combining heavy gas oil resulting from the first-mentioned cracking treatment with the remainder, subjecting the composite mixture to separate and independent cracking treatment, and separating a desired distillate product from the products resulting from the last-mentioned cracking treatment.

* * *

Lubricating oil. No. 2 097 162, *issued Oct.* 26, 1937; *filed Sept.* 30, 1935; *J. M. Musselman and H. P. Lankelma, assignors to Standard Oil Co. (Ohio); No drawing;* 2 *claims.*

Degradation of a lubricating oil is inhibited by addition of tetramethyldiaminophenylmethane. Less than 1% is generally sufficient.

* * *

Solvent recovery. No. 2 096 950, *issued Oct.* 26, 1937; *filed Oct.* 6, 1932; *R. E. Wilson, assignor to Standard Oil Co. (Ind.); one drawing;* 8 *claims.*

Dichlorethyl ether and acetone are removed from mineral oil by heating a mixture of solvents and oil to 400° F., introducing the heated mixture into a rectifying zone at an intermediate point, adding liquid acetone at the upper part of the zone, withdrawing dichlorethyl ether between the point of introduction of the acetone and the point of introduction of the heated mixture, introducing hot acetone at a point below the point of introduction of the mixture so that it serves as a stripping medium, and withdrawing finished oil from the base of the fractionation zone.

* * *

Diesel fuel. No. 2 096 798, *issued Oct.* 26, 1937; *filed Jan.* 26, 1931; *W. F. Faragher, assignor to Universal Oil Products Co.; one drawing;* 5 *claims.*

In an oil cracking system in which resultant cracked vapors are separated from residue and dephlegmated to condense heavier insufficiently cracked fractions, the uncondensed light cracked vapors are passed to a vapor phase heating zone where the unsaturated content is increased. These heated vapors are contacted with a polymerizing agent to produce a product boiling at 200-600° F. and suitable as diesel engine fuel.

* * *

Pipe coating. No. 2 096 876, *issued Oct.* 26, 1937; *filed May* 25, 1934; *C. J. Bitzer, assignor to Standard Oil Development Co.; no drawing;* 2 *claims.*

Ground mica and slate are added to a bituminous com-

position to increase tensile strength of pipe coating material. Proportions are 5-10% mica, 30-35% slate, and 55-65% bituminous material. Softening point is 180-190° F.

* * *

Solvent extraction. No. 2 096 725, *issued Oct.* 26, 1937; *filed June* 13, 1935; *C. E. Andrews and M. R. Fenske, assignors to Rohm & Haas Co.; no drawing;* 16 *claims.*

Hydrocarbons are separated into fractions by mixing with methylamine so that at least two phases form. The lower amines of the aliphatic series, particularly the three methylamines, either alone or in mixtures among themselves or with ammonia, water, methanol, or other liquids, are said to be effective for removing undesirable hydrocarbons, either by extraction or precipitation.

* * *

Extreme pressure lubricant. No. 2 094 097, *issued Sept.* 28, 1937; *filed April* 24, 1934; *F. B. Downing and A. F. Benning, assignors to E. I. du Pont de Nemours & Co.; no drawing;* 20 *claims.*

Metallic bearing surfaces are contacted with a combination of oxidizing nitro-bodies and a sulfur containing material capable of being oxidized. These materials adhere to metal surfaces forming non-corrosive lubricating films particularly valuable at high bearing pressure. Such films will not be washed off by water, oil or ordinary organic solvents such as gasoline, naphtha, and the like.

It is found desirable to employ the combinations in lubricating oil or grease. Particularly effective compounds are di-nitro phenyl thiocyanate, o-dinitro diphenyl d disulfide, tetra nitro diphenyl sulfide, dinitro phenol plus lorol thiocyanate, alpha-nitro naphthalene plus a mixture of amyl mercaptans, alpha-nitro naphthalene plus dilauryl disulfide.

* * *

Grease. No. 2 094 576, *issued Oct.* 5, 1937; *filed May* 1, 1935; *M. H. Arveson, assignor to Standard Oil Co. (Ind.); no drawing;* 7 *claims.*

An acid resistant plastic resin is substituted for soap in grease. Resins are of various types of high molecular weight, should be plastic below 0° F., and saturated. A preferred resin is made by polymerization of isobutylene with aluminum chloride or boron trifluoride at 30° to —80° F. or less. An acid resistant filler, such as air-floated asbestor, may be added.

* * *

Distilling pressure tar. No. 2 095 963, *issued Oct.* 19, 1937; *filed Feb.* 10, 1928; *Otto Behimer, assignor to The Texas Co.; one drawing;* 3 *claims.*

Recovery of a maximum of desirable light oils from tarry residue is accomplished so that these constituents may be treated to form gasoline or may be re-cycled through the pressure still. This is done by releasing pressure on the tar in several stages to a final stage under vacuum.

Oil is cracked, liquid removed and expanded into an unheated stripping still at atmospheric pressure to vaporize gasoline and higher or intermediate constituents. These vapors are fractionated to separate out the gasoline as an overhead vapor fraction to be condensed. The unvaporized residue is held under vacuum in a second stripping still to separate out as vapors heavier constituents without added heat. Condensate is recovered from these vapors and used as charging stock to the cracking zone. Resultant stripped residue is withdrawn from system.

* * *

Conversion. No. 2 096 210, *issued Oct.* 19, 1937; *filed June* 28, 1935; *K. Swartwood, assignor to Universal Oil Products Co.; one drawing;* 9 *claims.*

Charging stock is contacted with hot vaporous conversion products in a vaporizing chamber. Resulting vaporous low boiling components of the charging stock and the commingled vaporous conversion products from the vaporizing chamber are cracked. Non-vaporous high boiling components of the charging stock are withdrawn with commingled liquid conversion products from the vaporizing chamber and cracked. Heated products are introduced into a coking chamber wherein their high boiling components are reduced to coke.

Vaporous products are withdrawn from the coking chamber and introduced into the reaction chamber to commingle with the vaporous products from the vaporizing chamber and be subjected to continued conversion. Vaporous and liquid conversion products are separated in the reaction chamber and the latter returned to the coking chamber. The vaporous products from the reaction chamber are fractionated for formation of reflux condensate. Fractionated vapors of desired endpoint are condensed, the distillate recovered, and reflux condensate formed by the fractionation is cracked independently. A portion of the heated products are introduced into the vaporizing chamber to commingle with and effect vaporization of charging stock.

* * *

Lubricant. No. 2 096 390, *issued Oct.* 19, 1937; *filed Dec.* 27, 1934; *A. W. Burwell and A. Kempe, assignors to Alox Corp.; no drawing;* 5 *claims.*

A small amount of neutral aliphatic alcohol esters of free saturated aliphatic hydroxy carboxylic acids content of an oxidation reaction mixture is added to lubricating oil. It is obtained by controlled liquid-phase oxidation of hydrocarbons at 212-347° F. and not over 320 pounds per square inch in the presence of an exciter of oxidation, the alcohols being members of the group consisting of relatively low molecular weight, normally liquid aliphatic alcohols including glycerin and glycol, and the alcohols derived from the aforesaid mineral hydrocarbons in the production of the acids.

Addition of one or more non-acidic oxidized hydrocarbons has been shown to improve "oiliness" and extreme pressure characteristics while generally reducing internal friction of the oil film.

Dr. Leslie Joins Blaw-Knox

Dr. E. H. Leslie, authority on the chemical process industries, has joined the technical staff of Blaw-Knox Co., Pittsburgh. In his new capacity, he will supervise design and manufacture of equipment for the chemical and oil refining industries.

Dr. Leslie is best known as a consulting engineer and for his operation, since 1923, of the Leslie Laboratories at Ann Arbor, Mich. For eight years he was a professor of chemical engineering at the University of Michigan.

Dr. E. H. Leslie

N. P. N. SEMI-ANNUAL SUBJECT INDEX

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To Stress Fuel-Engine Design Co-ordination At S.A.E.

"The Diesel Engine's Place in Modern Transportation" will be shown in his inimitable manner by C. F. Kettering, general director of General Motors Research Laboratories, for the Society of Automotive Engineers at its annual dinner at Detroit, Thursday evening Jan. 13th, says the preliminary announcement of the winter meeting of the Society. Technical advancement and the trends of future technical developments will receive more attention at this meeting than has ever been the case before, J. A. C. Warner, executive secretary promises.

Aircraft problems, including aerodynamic, engine, and engine fuel and lubricants phases, will occupy four sessions. Among the subjects to be discussed are knock suppressors, aviation spark plug problems, accessory drive, aircraft instruments, and problems of design of planes and plane components.

Fuels and lubricants will be treated in three sessions, which will stress the growing need for co-ordination between engine developments and the advances being made in lubricants and motor fuels. One outstanding subject to be brought up is "What is an E. P. Product?", to be discussed by J. A. Moller, Pure Oil Co., as indicated by the preliminary program. Other subjects are reduction of piston and cylinder wear; effect of oil on wear in aviation engines; carburetion, manifolding and fuel anti-knock value, and three CFR reports on road and laboratory fuel tests, and the motor survey recently completed.

Diesel engine supercharging is a subject growing in interest and importance, and will be presented in two papers on Friday morning. Earlier, on Thursday morning, two more papers will present the newest developments in aircraft diesels and on deposits in diesels, as affected by types of fuel and operating conditions.

Transportation and Maintenance will occupy most of the attention on Monday, Jan. 10th, with four papers of special interest in that field. Advance registrations indicate that last January's record of 2500 in attendance will be eclipsed at this meeting.

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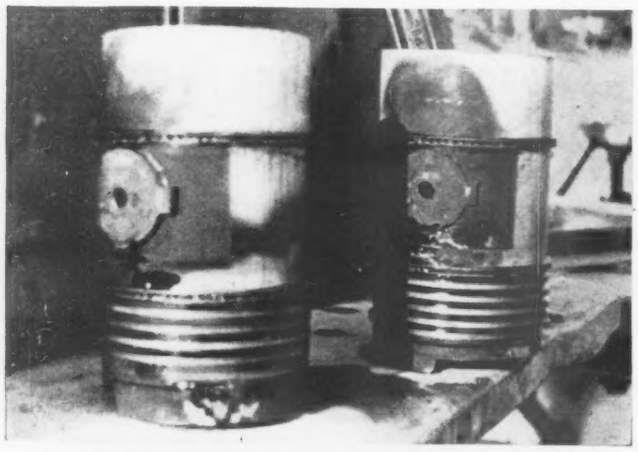

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BOOK ON CATALYSIS

"CATALYTIC Reactions at High Pressures and Temperatures" is one of the most absorbing technical subjects among refining technologists today, and is therefore a most timely and fitting title for this 800-page volume just off the press, written by V. N. Ipatieff who is doubtless the most outstanding authority on Catalysis in the world.

This book covers the subject completely in its various phases, and does so in a manner to make it the most useful book on catalysis yet made available to the chemist. Price is $7.50.

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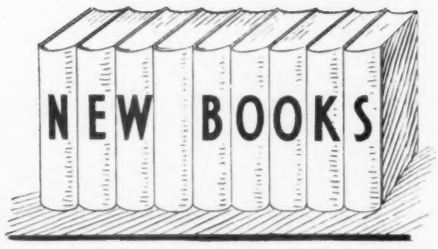

The Science of Petroleum

An International Treatise on Petroleum Technology

The Science of Petroleum is doubtless the most complete treatise on the production and refining of mineral oil that has been published in the history of the industry. Certainly is the most complete since Redwood's famous volumes, if advance information can be accepted. Redwood is long since obsolete on the technology of the industry.

This work, soon to be issued by the Oxford Press of London and New York, is an international project, covering in four volumes the entire field of petroleum and its technology. Contributors to the number of 322 combine in the one work the best scientific developments of every modern country. Practically half the material contributed comes from American technologists, the remainder being given by English, Dutch, German, French and other European and Asiatic collaborators.

The work has been carried out under the direction of Dr. A. E. Dunstan, world-known technologist chief of Anglo-Iranian Oil Co. of England. The chief American editor is Dr. T. B. Brooks, consulting chemist of New York City. Drs. Brooks and Dunstan have been aided in this country by Dr. Geo. G. Brown, F. G. Clapp, F. J. Fohs, Drs. Per K. Frolich, V. R. Garfias, J. Bennett Hill, W. A. Peters, in England Dr. A. W. Nash is a heavy contributor and assistant in the huge edition, along with H. T. Tizard.

For the reason that it is difficult to keep a published bound work up-to-date in a field of technology expanding as fast as is that of the petroleum refining and production industry, the need for a new and modern work to supplant the older and obsolete publications has been felt for some years. The editors of this book so feel the need of having its contents represent the best known information at the time of its publication that it is reported the fourth volume will contain the newest developments which have come to light since the work was started. ,

* * *

Chemical Engineering

Principles of Chemical Engineering, by Walker, Lewis, McAdams and Gilliland, has been revised and is being published in a third edition. It gives for each fundamental process the various methods for accomplishing desired results, describes the necessary apparatus, offers suggestions on operation, explains calculations, and solves illustrative problems.

The chapter on flow of fluids has been entirely rewritten. Since energy balances underlie every problem, they are developed and discussed in detail. Their utility is emphasized by applying them in derivations of quantitative relations for orifices, nozzles, Venturi meters, and pilot tubes.

The chapter on flow of heat has also been entirely rewritten. In the section on convection the importance of the type of fluid motion is developed. Recent developments in boiling liquids are discussed and condensation of vapors is treated in detail. The general problem of evaluating mean temperature difference is treated, relations being developed for multipass and crossflow exchangers.

Throughout this revised edition, emphasis is laid on the importance of material and energy balances, equilibria, and rate relationships, and the technique of using these in solving practical problems. Chapters on crush-

ing and grinding, sedimentation, evaporation, and filtration are a few that have been brought up to date.

The new book, containing 750 pages, 6 x 9, and 227 illustrations is available in the Book Department of NATIONAL PETROLEUM NEWS for $5.50

Inhibits Gas Hydrate Formation With Ammonia in Pipelines

Formation of natural gas hydrates which form obstructions in gas lines is now being inhibited by use of anhydrous ammonia. Minimum effective concentration has been ascertained in the laboratory to be 42 parts per million for a Panhandle field gas containing 0.2% carbon dioxide. Ammonia appears to owe its effectiveness to the fact that it combines with water to form a solution of ammonium hydroxide and ammonium carbonate, according to J. T. Russel, Panhandle Eastern Pipe Line Co.

A series of experiments lasting 72 days indicated no damage was done to copper-bearing alloys used in transmission lines. No solid ammonium salts were formed with concentrations up to 130 parts per million. Ammonia has been used successfully to remove an obstruction completely arresting gas flow, the gas hydrates apparently liquefying in place.

Two types of injection apparatus have been designed, one for continuous injection and the other for occasional clearing of lines. The most satisfactory type consists of a Pitot tube to utilize the dynamic head of the flowing gas to cause a portion to be bypassed over liquid ammonia contained in a reservoir adjacent to the pipeline.

Line losses are not as great as laboratory experiments indicated. In one instance a concentration of 130 parts per million in a main line was reduced to 43 parts in traveling 400 miles from the point of injection. Cost of protection against gas hydrate formation can be calculated as 8.7 cents per million cubic feet if ammonia is purchased in tank cars and 30 cents per million cubic feet, if purchased in cylinders. In one instance the annual cost was about $2700 for a flow of 100,000,000 cubic feet per day.

Air Corps Buys 281 New Engines

WASHINGTON—Three contracts with Wright Aeronautical Corp. for a total of 281 aircraft engines were recently announced by Louis Johnson, Assistant Secretary of War. The total cost of these engines is $2,491,820.

Of these engines, 156 are single-row, 9-cylinder developing more than 1000 hp. each. They will be installed in bombardment planes being built by Boeing Aircraft Co., or held as spares for those planes. Eighty-two single-row 9-cylinder engines of 850 hp. each are also included in the list.

The remaining 43 engines are double row 14-cylinder developing 750 hp. each, destined for installation in attack planes of the Northrop type.

It is understood that, while these engines are not confined to the use of 100 octane number fuels and may use fuels of lower anti-knock rating, all of them are easily convertible to require 100 octane number. This is apparently in line with the policies of the War and Navy departments to change over gradually to the higher type fuel but not to be "caught short" in case of emergency to find themselves equipped with engines requiring fuels which cannot be supplied in sufficient quantity on short notice to meet emergency requirements.

OCECO Swing Lines
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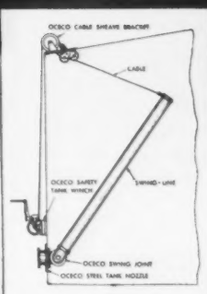

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AT LAST—an ultra-modern, up-to-the-minute 872-page volume on greasemaking and its use for lubrication, by a recognized authority. New developments are given in this book for the first time in permanent published form.

This new book is the only publication available today which covers the entire grease field. The newest technology of greases is presented in detail. Hundreds of types of greases are discussed.

Some of the subjects discussed are: The Theory of Lubricating Grease and Their Manufacture; Colloidal Nature of Greases; Grease-making Materials and Equipment; E. P. and Hypoid Compounds and Lubricants; Calcium, Sodium, Aluminum, Lead, and other Types of Greases; Miscellaneous Organic and Inorganic Lubricants; and Foreign Grease Specifications both Manufacturing and Application Methods—Information obtainable from no other American source.

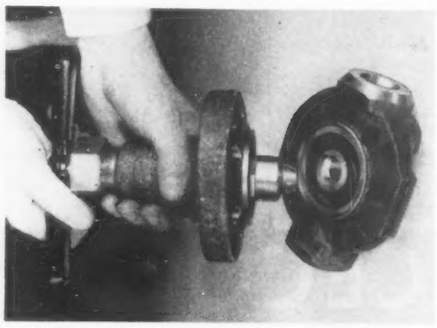
Price $15. Order It from Book Department

NATIONAL PETROLEUM NEWS
1213 W. Third St. • Cleveland, Ohio

Activities OF EQUIPMENT MANUFACTURERS

Valve

A new type of steel valve called the Hancock Duravalve is announced by Manning, Maxwell & Moore, Inc., Bridgeport, Conn. Designed for high pressure and high temperature service (1500 pounds at 950° F.), the makers



claim that with internal Stellite seats steam leaking between the valve seat ring and the valve body is stopped. Valves are made in one basic size and then tapped, or bored for welding, for ½, ¾, or 1-inch pipe.

* * *

Pipe Couplings

H. R. Shidel has been serving as southwest oil-field representative for S. R. Dresser Mfg. Co., Bradford, Pa., since Oct. 1. The company manufactures flexible pipe couplings and pipeline repair devices. Shidel is well known in this area through various engineering and sales connections. His headquarters are in Houston.

* * *

Diesel Engines

Expanding its line of high-speed diesel engines to smaller and more popular sizes, Hercules Motors Corp., Canton, Ohio, has announced the series "DOO" four-cylinder diesels. Three models are announced. The smallest has a bore of 3¾ inches and stroke of 4½ inches, with total piston displacement of 198.8 cubic inches. It is rated at 62 h.p. at 2600 r.p.m. In general, design principles follow those of larger engines.

* * *

Water Cooling Equipment

A new set of catalogs containing engineering data and information on its line of water cooling towers and industrial spray nozzles is announced by the Binks Mfg. Co., Chicago.

* * *

Pyrometers

A new 8-page bulletin (No. 503) on indicating pyrometers is announced by Wheelco Instruments Co., Chicago.

* * *

Gas Separators

The Cabot Carbon Co. has recently placed in operation a Girbotol unit in its new gasoline plant at Kermit, Texas, to remove hydrogen sulfide from natural gas used as engine fuel and for domestic heating. The unit is similar to one operating several years in the Shell-Continental plant at Hobbs, N. M.

The process will be used also by Gulf Oil Corp. for removing carbon dioxide from synthetic hydrogen in the company's plant now under construction at Port Arthur. The Girdler Corp., Louisville, is licensee.

* * *

Insulation

A new 64-page catalog of Johns-Manville industrial products is now available. Profusely illustrated, it contains information and recommendations on high and low temperature insulations for most industrial needs. Copies (Form GI-6A) are available on request to Johns-Manville, 22 E. 42nd St., New York.

* * *

Latest information on the construction of pipe lines by electric welding for transportation of oil, gas and water is contained in a new bulletin just published by The Lincoln Electric Co., Cleveland, Ohio.

The new bulletin is entitled "Building Better Pipe Lines Faster at Less Cost by Shielded-Arc Welding." Tabulated data include: recommended sizes of electrode for pipe line welding, average speed for shielded arc welding, recommended amperage and voltage for various sizes of rod, pounds of electrode per weld and recommended spacing for pipe.

Two are devoted to the specifications developed by one of the largest pipe line construction companies for the arc welding of oil, gas and water pipe lines. The specifications apply to pipe connected by a three bead joint without liner, a two bead joint with liner and joint in water pipe over 36 inches in diameter.

* * *

Plastic Coupling

A new technical bulletin has just been issued by Continental-Diamond Fibre Co., Newark, Del., covering Celoron Molded Plastic Coupling. In tests these couplings have broken steel shafting supporting the coupling without even fracturing the coupling at the keyway or the teeth. Light weight and low cost are cited as main advantages.

* * *

Scale and Corrosion Control

D. W. Haering & Co., Inc., scale and corrosion control chemical and proportioning manufacturers, Chicago, are announcing several increases in personnel and facilities. These include complete laboratory and consulting facilities at Wichita Testing Laboratories, Wichita, under C. E. Erb, and at Alameda, Cal., through Best & Co., under Dr. Otto Best. Sales, Service and warehousing facilities have been established in New York under Leon Garneau.

* * *

Riehle Testing Machine Division of American Machine and Metals, New York, announces establishment of a Chicago sales office in the Pure Oil Bldg., 35 E. Wacker Dr.

* * *

Conveyers

Mathews Conveyer Co. announces opening of a sales-engineering office in Detroit. Two engineers familiar with the Michigan territory and its requirements will be in charge.

M. E. Nicklin, export sales manager for Waukesha Motor Co., has resigned his position to return to the oil industry as assistant to W. C. Ramsey,

manager of the machinery division of Oil Well Supply Co., Oil City, Pa.

Mr. Nicklin is known throughout the industry as the author of a treatise, "Something About Gas Lift," published in 1928 in connection with his specialty in engines in oil field work.

* * *

To Use TVA Power

Electric Metallurgical Co., unit of Union Carbide and Carbon Corp., has contracted to purchase power from the Tennessee Valley Authority to use at a new plant in the Wilson Dam, Alabama, area. The contract will run for 20 years unless a 90-day option to cancel is exercised by the company. Ferro-alloys, calcium carbide, and other electric furnace products will be manufactured at the new plant.

* * *

Bulletin on Belts

The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J., has just issued a new illustrated 4-page bulletin on its Condor compensated belts.

* * *

Fire Hose Manual

A fire department manual on hose and hose couplings has been published by the National Fire Protection Assn. This 40-page illustrated pamphlet covers care of cotton rubber-lined and unlined linen hose, testing, hose coupling data, and other related material. Copies are 25 cents each.

* * *

Controller

Temperature recorders and controllers for furnaces are described in new Bulletin No. 462 published by The Bistol Co., Waterbury, Conn.

* * *

Pipe Repair Handbook

How to repair pipe leaks without shut-offs is described in the new "Pipe Repair Handbook" just published by M. B. Skinner Co., South Bend, Ind. It covers all the various kinds of leaks in piping—splits, pitted or corroded sections, and joints such as threaded joints, bell and spigot joints, welded joints, collars, and others.

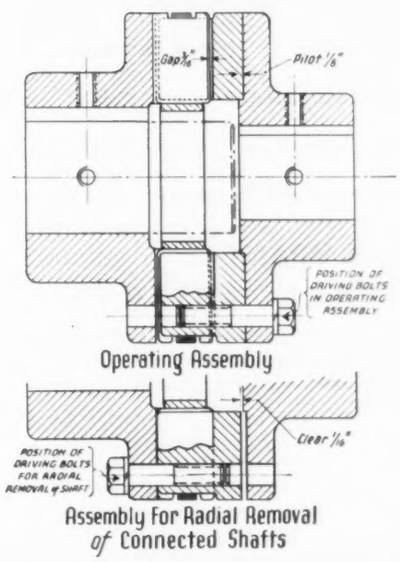
* * *

Flexible Coupling

A new flexible coupling, the L-R Type WQ, recently developed by Lovejoy Flexible Coupling Co., Chicago, has the feature of disconnecting without moving the load cushions or steel retaining band. Only work is removal of cap screws and reversal so they operate from the other jaw body.

The coupling has one set of jaws made in the form of a removable ring which is held in place and driven by hexagon head alloy steel cap screws.

L-R FLEXIBLE COUPLING
TYPE "WQ"


Gap 1/16"
Pilot 1/8"
POSITION OF DRIVING BOLTS IN OPERATING ASSEMBLY
Operating Assembly
Clear 1/16"
POSITION OF DRIVING BOLTS FOR RADIAL REMOVAL OF SHAFT
Assembly for Radial Removal of Connected Shafts

* * *

Build Model Well

The School of Petroleum Engineering of the Agricultural and Mechanical College of Texas has assembled a complete faithful 1/6 scale model of a producing well for students' laboratory study and experimentation. Manufacturers and distributors of oil field equipment are supplying models of their equipment.

The Drane Tank Co., distributors of Butler Bolted tanks, Fort Worth, requested a model crude oil storage Bolted tank. Butler Mfg. Co., Kansas City, has built the tank in full detail including 3000 especially-made miniature bolts and center ladder-rail roof support topped with a gas-tight manhole. Total height is less than three feet.

* * *

Welding

The Linde Air Products Co. has published a folder entitled "Steel Hard-Facing Procedure", the material being reprinted from Oxy-Acetylene Tips for April, 1937.

* * *

Pressure Governor

General Electric Co. has issued a catalog insert sheet on Pressure Governors (CR2922-E) which are recommended for use with automatic starters for alternating-current and direct-current motor-driven pumps or compressors to maintain a constant pressure between set limits on liquid or gas systems.

INDEX TO ADVERTISERS

Refining Technology Section

(*See also page 56*)

This index is published as a convenience to the reader. Every care is taken to make it accurate, but National Petroleum News assumes no responsibility for errors or omissions

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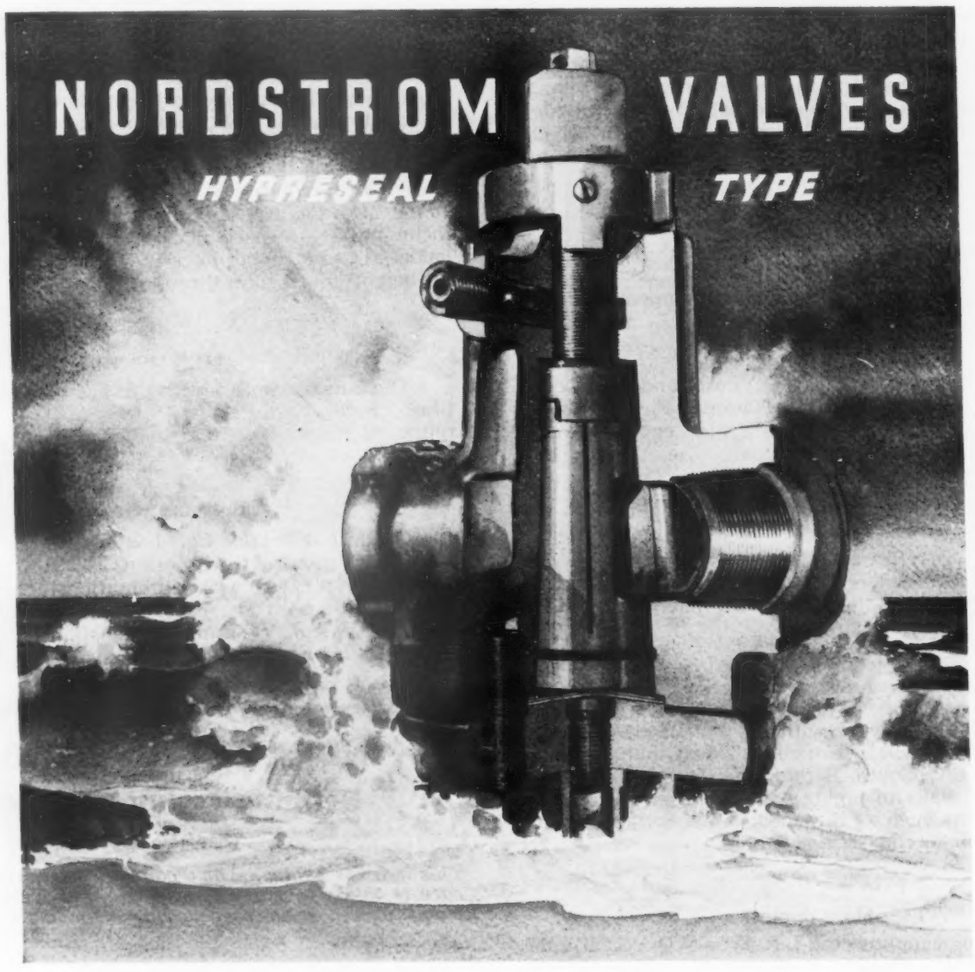

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Oil News Headlines of 1937

• A chronology of important events in the oil industry, or affecting the oil industry, taking place in 1937, compiled from the News Section of National Petroleum News.

Jan. 4.—Crude price jumps. Mid-Continent grades advance 17 cents a barrel, Continental Oil Co. taking the lead.

Jan. 5.—75th Congress convenes. Among a mountain of other legislation, it faces 26 important bills affecting oil.

Jan. 26.—Flood relief. Into the flood-stricken Ohio River valley goes oil company assistance—gasoline, trucks, men.

Jan. 28.—Other major oil companies follow in advancing Mid-Continent and southwestern crudes, their advance being 10 cents a barrel. Other grades follow.

Feb. 15.—Gasoline weighs in. Illinois marketers protest railroads' 6.6 pound weight for gasoline.

Feb. 22.—Ethyl in the dog house. Anti-trust suit filed against Ethyl Gasoline Corp. by the U. S. Dept. of Justice.

March 8.—The march of the "conspirators." At Madison, defendants in the federal "oil conspiracy" case are arraigned.

March 10.—Death takes J. S. Cullinan, founder of Magnolia Petroleum Co. and The Texas Corp.

March 23.—Fatter pay envelopes. Wage boosts given to 30,000 Mid-Continent oil field workers.

April 5.—Lewis vs. Green vs Oil. Rival unions, A.F.L. and C.I.O. begin the battle for their share of the southwestern oil worker.

April 5.—Investigation is born. Pennsylvania House votes in favor of a study of oil goings-on by its legislature.

April 12.—A profit is not without honor. Shell Union reports the highest profit in 10 years. A bonanza.

April 27.—Ickes vs. Ickes. No need for federal oil control, Ickes, Secretary of Interior, testifies at Connally "hot" oil law hearing.

May 3.—Millions for expansion. Consolidated Oil and Standard of Indiana each plan to spend approximately $50,000,000 in improvements.

May 17.—A flair for monopoly. Proposal made to Congress for U. S. monopoly of oil, gas, and coal.

May 23.—"John D." taken by death. John D. Rockefeller, Sr., founder of the Standard Oil Co., succumbs.

June 1.—Another Roosevelt bombshell. A.P.I. and oil men plan to fight Roosevelt's proposed elimination of the depletion allowance clause in income tax law.

June 11.—Pennsylvania petroleum purge. Investigation of the state's oil industry is started by a Pennsylvania legislative committee.

June 15.—Connally law extension. Roosevelt signature extends Connally "hot" oil law two years.

June 17.—Texas ouster. Texas restores its ouster suit against 15 oil companies and two trade associations.

June 20.—Jubilee week. Celebrating the founding of the Ohio Oil Co., Findlay, Ohio, throws a Golden Celebration of Oil and Gas.

July 1.—Price posting laws. In Iowa and Pennsylvania, the new price posting laws become effective.

July 6.—U. S. points a finger. The federal gasoline tax evasion net gathers and indicts 53 southeastern oil men and others.

July 8.—Legislative finger-dipping. New York State legislative investigating committee proposes an oil probe for every state.

July 12.—Solving the eternal triangle. The Biermann Bill, to divorce marketing from refining and producing, is introduced in Congress.

July 12.—Esso vs. S. O. The Standard of New Jersey cannot put up its shingle in S. O. of Indiana territory, says U. S. court.

July 19.—Wisconsin plan. Wisconsin independent jobbers set sail on group marketing program.

July 19.—Pipeline planned. Stretching from Oklahoma to central Iowa and the Mississippi River, a gasoline pipeline is jointly planned by Anderson-Prichard, Bell Oil & Gas, Cushing Refining, and Rock Island Refining.

July 23.—Fair trade becomes law. Michigan's fair trade practice law becomes effective, making discounting and below-cost selling unlawful.

Aug. 16.—Illinois boom. Staging an oil-producing comeback, discoveries are made in Marion and Clinton counties of Illinois.

Aug. 27.—Bandaged California law becomes active. The amended California oil substitution act, including price posting, goes into effect.

Aug. 31.—More price probing. The U. S. Dept. of Justice, already knee-deep in oil investigations, says it will probe into crude price fixing.

Sept. 7.—No more ethics. The Federal Trade Commission cancels the oil code of marketing ethics.

Sept. 20.—More weight to the weight case. In Illinois, 236 oil companies enter the case protesting the 6.6-pound gasoline weight used by the railroads in fixing gasoline freight rates.

Oct. 4.—Judge Stone's gavel falls. The "oil conspiracy" trial opens at Madison—the Government vs. 58 oil men, 23 oil companies, and three trade papers.

Oct. 19.—Trial highlight. A U. S. witness describes the "buying plan" at Madison trial.

Nov 8.—18th for A.P.I. The 18th annal meeting of the American Petroleum Institute opens in Chicago.

Nov. 12.—The prosecution rests. The Government closes its case in the "oil conspiracy" trial at Madison, and dismisses the charges against Warren C. Platt, of NATIONAL PETROLEUM NEWS and *Platt's Oilgram*.

Nov. 15.—Sabbath Holiday for Texas oil. Sunday shut-down of East Texas production is ordered by the Railroad Commission of Texas.

Nov. 22.—Death takes Kingsbury. Standard Oil Co. of Calif. president, K. R. Kingsbury, dies.

Nov. 23.—Fresh air for seven. Judge Stone dismisses seven more defendants at the Madison trial.

Dec. 1.—Cracking the history books. Cracking patent history is made as a licensing agreement is signed by Universal Oil Products Co., The Texas Co., Gasoline Products Co., and others.

Dec. 21.—State regulation. At a Chicago meeting of representatives from 24 states a committee is formed to give further study to state regulation of the oil industry.

Oil's Biggest Markets Achieved Since 1929

GRANTING that the country generally is in the midst of a business recession, this fact should not cause marketers of petroleum products particular uneasiness, when it is considered that the volume of the oil industry's business, at the low point in the last depression, was equal to or well above its 1929 level, A. R. Maulsby, assistant district manager, White Eagle Division, Socony-Vacuum Oil Co., Kansas City, pointed out recently in a message to White Eagle's sales force.

He introduced a series of charts, which are reproduced herewith, showing graphically the relationship between the oil industry and business generally in the perioid following 1929, and the growth in gasoline and motor oil consumption by various types of motor vehicles.

Not only was the progress of the oil industry, as indicated by the consumption of its products from 1929 to date, such as to allay uneasiness as to its course during the present business letdown; but, it was pointed out, "there is a vast difference between the situation of general business today, as compared to the period just prior to the last depression."

• The lines on the five charts accompanying this article show volume trends by years since 1929 in relation to 1929 volume, which is taken as 100 in each case.

A major factor in the situation today, Maulsby pointed out, is that industry generally and business is at a deadlock on three points: (1) the undistributed profits tax, (2) the unbalanced budget, (3) the labor pressure group. On this point and continuing with that portion of his statement having to do with the unanticipated growth of the oil industry from 1929 to date, his statement reads:

By A. R. Maulsby

At the present we are confronted with this peculiar situation: The Administration, in its anxiety to eliminate some of the evils that had occurred in previous years, put into effect certain measures which reacted to the disadvantage of business to the extent that industry in general is unwilling and unable to continue with sufficient private spending to offset the reduction in government expenditures. So, we find ourselves today with industry and the Administration at a deadlock on these three points:

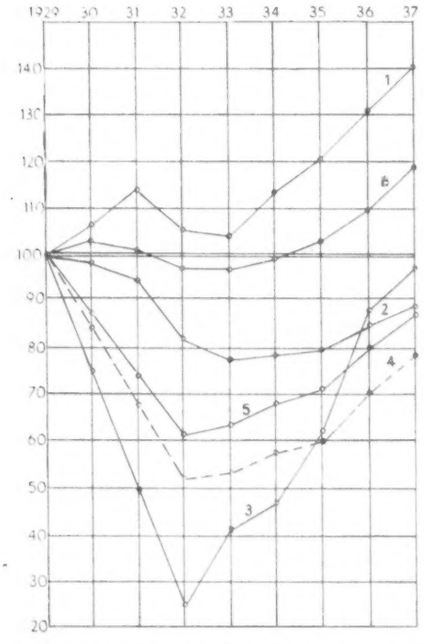
1. The undistributed profits tax.
2. The unbalanced budget.
3. The labor pressure group.

The undistributed profit tax makes it impossible for small business to expand, and removes the incentive for big business to pick up by necessary expansion where government left off, resulting in, at least, temporary indecision, fear and rather extensive factory shut downs.

The controversy directly between industry and labor has also had adverse effect on business. Labor demand for exorbitant wages has reflected itself in too sharp an advance in prices of commodities, resulting in universal buyer's resistance and curtailment of

CHART 1

Petroleum's Markets, 1929-1937 Compared To All Other Industries



Key—1—all gasoline consumption, 2 — motor vehicle motor oil consumption, 3 — steel production, 4 — freight car loading 5—coal consumption, 6—motor vehicles in use.

Left—

Steel dropped to 25% of normal during the depression period and car loadings to about 50%. Coal consumption fell off at least 40% during 1932 as compared to 1929.

The number of automobiles in use showed a decrease in 1932 and 1933 of only about 2.5% as compared to 1929 and, during 1930 and 1932, there were a larger number of automobiles in use than during the 1929 period.

The gasoline market for all purposes, automotive, industrial, illumination and so on, never fell below the 1929 level and, during 1931 and 1932, when all other industries showed lowest position, gasoline showed 12.5 and 7.5% increases over the 1929 level.

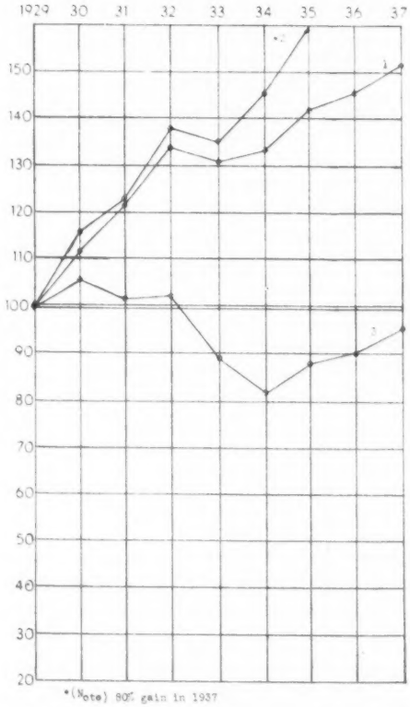
• • •

Right—

Progress in bus registration and gasoline and motor oil consumption by this type of motor vehicle from 1929 to 1937 inclusive, using the year 1929 as a basis of comparison. Both bus registration and gasoline consumption in this channel showed rapid increases during the years following 1929 and 1937 shows an increase of 80% in total gasoline consumed by motor buses.

CHART 2

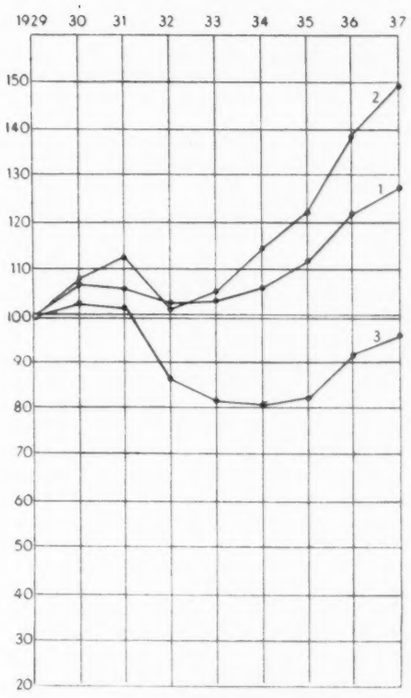
'Gas' and Oil Consumed In Motor Buses, 1929-1937



Key—(1) Bus registration, (2) gasoline consumption in buses, (3) motor oil consumption in buses.

CHART 3

'Gas' and Oil Consumed By Trucks, 1929-1937



Key—(1) motor truck registrations, (2) gasoline consumption by trucks, (3) motor oil consumption by trucks.

Left—

At no time from 1929 on was the number of trucks in use or the volume of gasoline consumed lower than their registration and consumption figures for 1929. Their consumption of motor oil was only moderately less than in 1929 and in 1937 reached close to the figure for the earlier year.

• • •

Right—

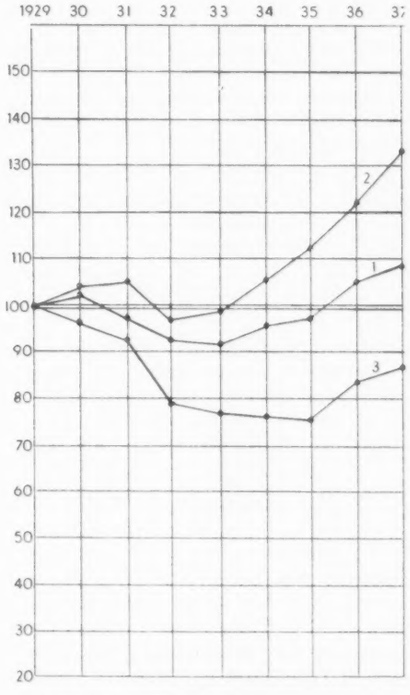
The figure for registration of all motor vehicles showed a very slight drop in 1932 and 1933 from 1929, approximately 1 and 2% respectively, while gasoline consumption in all motor vehicles either equalled or was above the 1929 level. Sales of motor lubricants generally showed a decrease, compared with gasoline consumption and vehicles registered; but even here the slump could in no way be compared with the falling off in unit volume in all other classes of business.

A factor in consumption of motor lubricants in recent years also has been the sales arguments of some car manufacturers and refiners to the effect that the period between changes in crankcase oil could be lengthened, thus tending to cut down volume consumption.

CHART 4

'Gas' and Oil Consumed By Passenger Cars, 1929-37

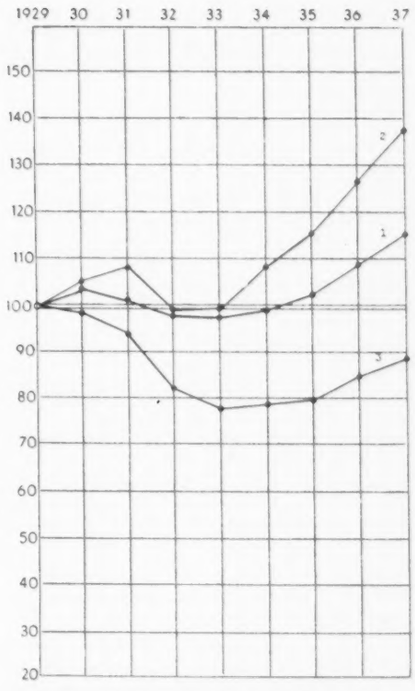
Passenger cars in use during 1932 and 1933 showed a slight drop as compared to 1929 but at no time did the decrease amount to more than 8%. Gasoline consumed in passenger cars only showed approximately a 3% decrease in 1932 and a fraction of 1% in 1933. At all other times in the period under study the consumption of gasoline in passenger cars was above the so-called peak year of 1929.



Key—(1) registration of passenger cars, (2) gasoline consumed in passenger cars, (3) motor oil consumed in passenger cars.

CHART 5

'Gas' and Oil Consumed in All Motor Vehicles, 1929-37



Key—(1) registration of all motor vehicles, (2) consumption of gasoline by all motor vehicles, (3) consumption of motor oil in all motor vehicles.

retail sales. At present we find labor running riot, and out of control; and industry standing pat, demanding protection and regulations through state and federal governments.

It is no more than natural that business men throughout the country, and sales people in particular, who experienced the depression of 1931-1932 and 1933, and in whose memory the sufferings of that period are still vivid, should at this time, when conditions at least resemble those just previous to the depression period, have a mild case of the "jitters", and be subjected to fear and indecision.

However, the situation now as compared to then is only comparable as to the character but in no way comparable as to degree. Between 1932 and 1937 there has been no universal inflation of bank credits, inflation of land values, or any considerable inflation of corporation stocks. This being the case, even though we do experience a temporary recession in general business, there is no possibility of liquidation in any sense comparable to the landslide which occurred shortly after 1929.

At present there is very little likelihood of bank failures so long as government bonds do not go below par. The situation now, as regards to banking, is entirely different from what it was in the other period. In 1929 banks were loaded to the guards with second and third mortgages, with corporation stocks as security for loans on marginal purchases of stocks. Today, bank paper consists largely of government bonds, and a close examination of banks will find little or no necessity of rapid liquidation in case of an ordinary business recession.

So looking at this present situation from those two points of view, the picture does not look particularly unfavorable. Furthermore, Congress and the Administration apparently are extending the olive branch to business and show at least some indication of being willing to pass corrective measures in favor of business.

The policy of reciprocal trade agreements with foreign countries seems to be gaining favor, both in Congress and by business men in general which, if perfected with large importing countries of farm products, will undoubtedly stimulate production in the United States agricultural area and increase the farmer's buying power which, obviously, furnishes the basis for permanent prosperity. The present negotiations with Great Britain in this regard are especially encouraging.

Private business is in position, and needs at this time, to spend $36,250,000,000 in expansion, replacement and general repairs, as compared to the government's $16,000,000,000 for relief in Public Works spent in the past five years. Assurance that no further puni-

tive measures are to be imposed upon business by the government will go a long ways towards restoring confidence and in releasing these funds for necessary expenditure.

Farm prices are still above the last ten years' average, and farm crops for 1937 are ahead of the 1928 to 1932 average yield.

Suppose now, we spend a few moments in the consideration of a comparison between the petroleum business now and at the time of the last major depression, and also compare the petroleum business in 1931 and 1932 with all other types of industry during that same period.

In the first place, the fact that petroleum lost so many million dollars during the depression period was due, not primarily to loss of potential market, but to the internal condition of the oil industry itself. Crude oil was selling for 20 cents a barrel, "hot" oil from East Texas was being manufactured into gasoline and shipped into other states. Distressed gasoline surpluses were piling up at all refineries. The price structure was broken until gasoline in Group 3 was once 1⅞ cents, and the extravagant trade practices of the industry within itself, such as loaned equipment, unprofitable leases, and so on together with a broken sales morale, put the oil industry into a panic and lost for it many millions of dollars.

But here are the astounding facts that, during 1931, 1932 and 1933, when all other business was at its lowest in unit volume, the oil business reached an all time record, ranging in volume greater than the peak year of 1929 prosperity. The oil industry in a large part has been cleaned up. The Tank Car Stabilization Committee, headed by our company and later prosecuted by certain jobbers in Wisconsin, the passing of the Connally act prohibiting interstate transportation of "hot" oil gasoline and the purchasing of distress gasoline by major companies, has gone a long way towards stabilizing price structures and cleaning house within the industry itself.

So, taking everything into consideration, there is a vast difference between the situation of general business today as compared to the period just prior to the last depression; and there is an even greater difference between the unit volume of petroleum merchandise sold at the low point in the depression, 1931-32-33, as compared to the unit volume of any other business enterprise during the same period.

The accompanying charts will reveal graphically this relationship betwen the petroleum industry and business in general.

Steel is nearly always indicative of business activities, and from the first chart you will notice that steel dropped to a 25% of normal during the depression period, and national car loadings to about 50%.

Coal consumption is somewhat indicative of industrial activities, and from the chart it can be seen that coal fell off at least 40% during the year 1932, as compared to 1929.

The number of automobiles in use, however, (chart 1) showed a decrease in 1932 and 1933 of only about 2½% as compared to 1929, and during 1930 and 1932 there were a greater number of automobiles in use than there were during the 1929 period. The gasoline market for all purposes, automotive, industrial, illumination, etc., never fell below the 1929 level and, during 1931 and 1932, when all other industries showed their lowest position, gasoline showed 12½% and 7½% increases for the year respectively over the 1929 level.

Analyzing the situation strictly from an automotive standpoint, chart 2 shows the progress in bus registration and gasoline and motor oil consumption from 1929 to 1937 inclusive, using the so-called peak year of 1929 as a basis for comparison. Both bus registration and gasoline consumption showed rapid increases during the years following 1929 and 1937 shows an increase of 80% on total gasoline consumed by motor buses.

The story relative to truck registration and consumption of petroleum products (chart 3) is somewhat similar to that of buses, but not to quite the same degree of increase hit. At no time were the number of trucks in use, or the volume of gasoline consumed, lower than the registration and consumption in 1929.

Passenger cars in use during 1932 and 1933 show a slight drop (chart 4), but at no time does the decrease amount to more than 8%. Gasoline, consumed in passenger cars only, shows approximately a 3% decrease in 1932 and a fraction of 1% in 1933. For all other years between 1929 and 1937 the gasoline consumed in passenger cars shows greater volume than the gasoline consumed for that purpose during the so-called peak year of 1929.

All motor vehicles show a very slight drop in registration during 1932 and 1933, approximately 1% and 2% respectively, while the gasoline either equaled or was above the 1929 level (chart 5).

Motor lubricant sales generally show a decrease, as compared to gasoline used and vehicles registered, but even here the slump could in no way be compared to the falling off of unit volume in all other classes of business.

A thorough study of these charts will prove to the oil salesman, and to the gasoline and motor oil retailer, that he has no occasion for the "jitters". We are faced with the probability of a short lived business recession, but this should cause the marketers of petroleum no particular uneasiness, especially when we consider the fact that, at the low point in the last depression, petroleum unit volume was equal to or above the 1929 level.

Gas Testers Assn. Elects Officers

TULSA, Dec. 27.—The Gas Testers and Metermen's Assn. will hold its annual meeting in Tulsa at the Mayo hotel May 13, according to an announcement made following the recent election meeting.

A. Lucas of the Skelly Oil Co. was elected president, succeeding J. V. Hodshire, Phillips Petroleum Co. C. L. Quast, Sinclair Prairie Oil Co., Tulsa, is secretary-treasurer, and Emery Love, Gulf Oil Corp., is counsel. Norris Plank, Shell Petroleum Corp., was reelected chairman to represent the Natural Gasoline Assn. of America on the executive committee.

Directors are E. A. Dean, Mid-Continent Petroleum Corp.; E. LeMarr, Kennedy Bldg., Mr. Plank, all of Tulsa; P. M. Childers, Continental Oil Co., Ponca City; T. W. P. Hall, Osage agency, and C. F. Gould, U. S. Geological Survey, Pawhuska, Okla.; Paul Rowlinson, Carter Oil Co.; H. L. Oder, Cities Service Oil Co., Mr. Hodshire, and G. E. Felton, Phillips Petroleum Co., all of Bartlesville; R. L. Lee, Sinclair Prairie Oil Co., Drumright; P. M. Bowman, Warren Petroleum Co., Shawnee; S. M. McAnnelly, Lone Star Gasoline Co., Dallas, and A. W. Olson, Sinclair Prairie Oil Co., Arp, Texas.

Digest of Inspection Laws is Revised

TULSA, Dec. 27.—A revised "Digest of State Inspection Laws Relating to Petroleum Products" has been issued by the Western Petroleum Refiners Assn. as of Nov. 1, 1937.

The new digest contains, in addition to the state inspection laws, the U. S. government specifications for all grades of gasoline and kerosine, the association's specifications for gasoline, No. 1 diesel fuel and tractor fuel.

The digest of the inspection law for each state is preceded by a listing of the department having supervision as well as the person in charge of the work, and the products inspected.

Heads Royalty Assn.

TULSA, Dec. 27.—James Hailey, of the Royalty Corp. of America, was elected president of the Mid-Continent Royalty Owners Assn. at its annual meeting in Tulsa. He succeeded Robert H. Wood, Tulsa geologist, royalty owner and oil producer.

Five vice-presidents elected were John G. Ellinghausen, Robert H. Wood, both of Tulsa; Sam Allen, Sapulpa; Frank Buttram, Oklahoma City and S. A. Dellaplain, Ponca City. H. M. McMillan, who has served as secretary-treasurer, agreed to continue in those positions until a permanent secretary can be chosen.

Don't bet your profits

If you got by through 1937 without Dubbscracking, you can thank your lucky stars—but here is a suggestion:

Don't bet another year's profits that you can do it again Don't push your luck too far

Maybe you can't always be lucky

But you can be wise

It's wise to install Dubbscracking now

Then 1938 will be a happy New Year for you—with many happy returns

Happy New Year

Universal Oil Products Co
Chicago, Illinois

Dubbs Cracking Process
Owner and Licensor

Meeting the 'Coal is Cheaper' Argument in Oil Heating

By **E. L. BARRINGER**
N. P. N. Staff Writer

• • •

BACK IN 1922 a group of Freeport, Ill., home owners invested in oil heating equipment, then sought a source of fuel. A major oil company offered to supply oil, providing immediate delivery would be taken on a tank car. The group turned to a local oil company, Johnson High Test Oil Co., and H. W. Johnson was willing to buy and store the fuel oil and make tank wagon deliveries as they were needed. By the following spring all the fuel oil had been delivered.

That arrangement placed the Johnson High Test company in the fuel oil business. Until last spring the company conducted similar operations in fuel oil, solely as a distributor. The only "service" given was in cleaning storage tanks or filters in case a customer sought such service. Oil heating equipment installation and service was handled by equipment firms.

Conditions developed in the heating contractors' relations with oil suppliers that, in Mr. Johnson's opinion, required the company to offer a complete heating service. Dual contacts with the home owner left the customer in the middle, between the supplier of the equipment and the oil supplier, in Mr. Johnson's opinion. So the company last spring established a complete oil heat equipment department, to offer customers a complete service from one source and to avoid the evils of heating contractors "recommending" sources of oil.

Decision on what line of heating equipment to handle was based on having one line to meet all heating requirements, so the company could offer oil heat for all buildings from a garage to a factory. The Johnson company also handles oil burning hot water heaters.

The major problem encountered in establishing the new department was in finding a suitable man to supervise burner installations. Many months were spent on this problem, answering classified advertisements in newspapers, seeking leads, and the man finally selected for the new department had many years experience on installation work for oil equipment sales agencies in Chicago. The new department has experienced men in sales, installation and service work.

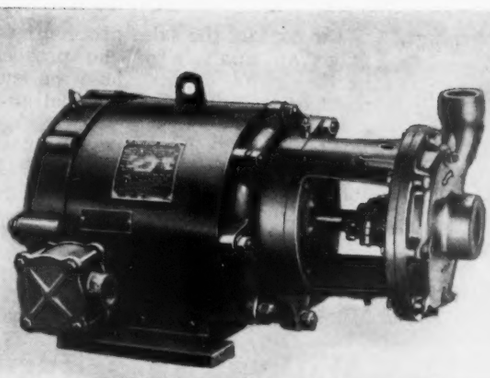
Another feature of the new oil heat department is the display room in Freeport's business district. The company has a large one-stop service station, just off the main street, with a second story added during a remodeling operation several years ago.

Automotive merchandise stored on the second floor of the station was removed. The walls were paneled, and the ceiling and floor refinished. Heating units of various types were moved in for the display. Purpose of the display room is to have a centrally located, convenient place to take customers. Here the customer and salesmen have a quiet place to view the various models without interruptions. Customers are also taken to view actual installations in Freeport homes.

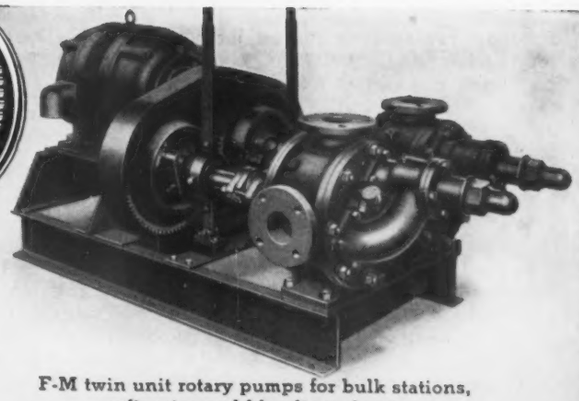
In establishing the burner department full page space was taken in the

OIL HEATING CAN BE ECONOMICAL!
WE ARE OUT TO PROVE IT
You have heard stories about the high cost of oil heat!. . . So have we! But it doesn't follow that oil heat HAS to be expensive—Some users report that oil heat actually costs LESS than coal. What is the reason for this disagreement?
As the supplier of approximately 80% of the fuel oil consumed in Freeport we are in a position to KNOW that more than 60% of the oil heating plants in use here today are consuming more fuel than would be required by an ideal installation. We have pledged ourselves to STOP THIS WASTE WHEREVER POSSIBLE and to help future buyers of oil heating equipment get ALL OF THE ECONOMIES TO WHICH THEY ARE ENTITLED.
1. The fundamental mechanical principle of some burners makes them natural "oil hogs"—others are naturally economical.
2. Some types of furnaces and boilers are not adaptable to oil burning and should NEVER be converted to oil heat. Others will function efficiently with oil firing.
3. The installation of a burner is a scientific problem and should be approached on a scientific basis. Where this procedure has been followed, satisfaction with oil heat has been complete. Where "rule-of-thumb" installation methods have been used oil heating has been costly.
OIL HEATING CAN BE ECONOMICAL ONLY—
1. When the correct type of oil burning equipment is used.
2. When the proper burner is installed in a heating plant that is adaptable for oil.
3. When the installation is made correctly according to scientific methods.
4. When the most highly efficient grade of fuel oil designed for your burner is used. If ONE of these requirements is ignored, oil heat will be more expensive than it should be.
SEVEN ERRORS IN INSTALLATION COST THIS HOME OWNER $100.00 LAST WINTER. AVOID THIS WASTE.
Watch for the announcement of the
FORMAL OPENING
Of Our Modern
OIL BURNER SHOW ROOM
The second floor of our Super Station at South Chicago avenue and Spring street is being remodeled for the display of GILBARCO equipment. It will be ready for your inspection soon.
THERE IS A MODERN-EFFICIENT
GI
HERE ARE THE ANSWERS to the Most Frequent QUESTIONS Concerning OIL HEAT!

When the Johnson High Test Oil Co., which had been selling fuel oil for some years, took on the sale of a burner and installed a service department, it introduced itself to the public as oil heating specialists through the medium of this page ad in the Freeport, Ill., paper



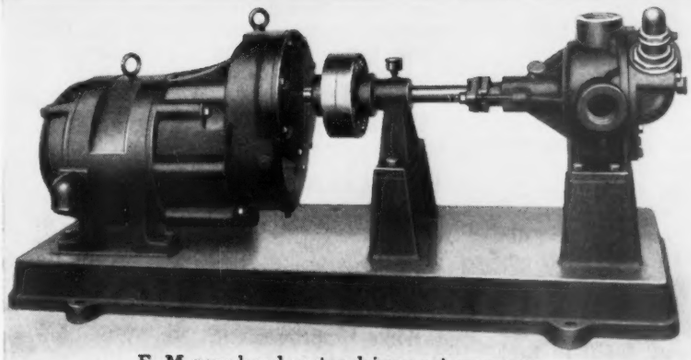
F-M built-together motor-pump units with explosion-proof motors



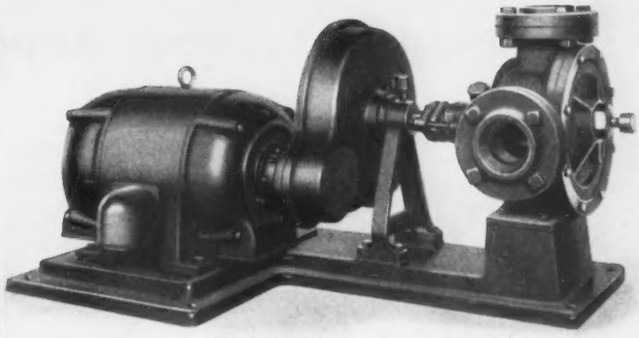
F-M twin unit rotary pumps for bulk stations, refineries and blending plants

How to choose a pump

FOR PETROLEUM SERVICE



F- M gear head motor-driven rotary pump



F-M gear-driven rotary pump

● Choose on four points. The pump itself. Its service record in similar service. The manufacturer and his reputation. The extent to which a manufacturer's recommendation is influenced by the type and size of pumps he happens to make.

To take the last point first. Fairbanks-Morse men are entirely free from bias toward any one type when they specify a given F-M pump for a job. For they have a complete line of pumps in many types and ratings from which to choose, and their recommendations are never handicapped by the mere desire to land an order. They can give you the right pump for the job, and without compromises that might affect efficiency.

We invite every user of petroleum-handling equipment to study the many Fairbanks-Morse pumps especially developed for this service . . . to examine their service records in typical installations . . . to learn of their manufacture and the unequalled service facilities that stand behind them.

For your copy of Bulletin O-69, address Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill. 34 branches at your service throughout the United States.

6912-PA02.8

FAIRBANKS MORSE

DIESEL ENGINES
PUMPS
ELECTRICAL MACHINERY
FAIRBANKS SCALES
RAILROAD EQUIPMENT
WATER SYSTEMS
REFRIGERATORS
RADIOS
WASHERS
FARM EQUIPMENT
STOKERS
AIR CONDITIONERS

Pumps

Freeport newspapers for an introductory advertisement. The company continued newspaper advertising, and has six billboards in the city. Leads are obtained from building permits issued for new homes.

In its newspaper advertising copy which introduced the Johnson High Test Oil Co.'s complete oil heat service to the public in Freeport, the company took the bull by the horns, so to speak, and started right off to talk about the cost of oil heating.

"You have heard stories about the high cost of oil heat!" this ad starts out. "So have we! But it doesn't follow that oil heat HAS to be expensive. Some users report that oil heat actually costs LESS than coal. What is the reason for this disagreement?"

Then the company goes on to say that, through its experience as the supplier of approximately 80 per cent of the fuel oil consumed in Freeport, it has found that oil heating can be economical only when these four conditions are met:

1—The correct type of oil burning equipment is used.

2—The proper burner is installed in a heating plant that is adaptable for oil.

3—The installation is made correctly according to scientific methods.

4—The most efficient grade of fuel oil designed for that particular type of burner is used.

Then the advertisement goes on to describe the "Jonsunite Plan of Single Responsibility," in which the proper size and type of burner is installed in the home based on a survey by a heating engineer; the right grade of oil is supplied, deliveries being double metered for absolute accuracy; factory-trained service men are available if trouble should arise, 24 hours of the day, Sundays and Holidays included.

The manager of the one-stop station housing the oil burner display room is active in burner sales and, with the installation manager, handles the customer contacts. Following the opening of the contact the sales procedure is to make an analysis of the prospect's heating requirements, show the equipment at the display room, and an actual installation in a home.

While the company is just closing the first season of burner sales Mr. Johnson reported an exceedingly good volume of sales, especially in the larger units.

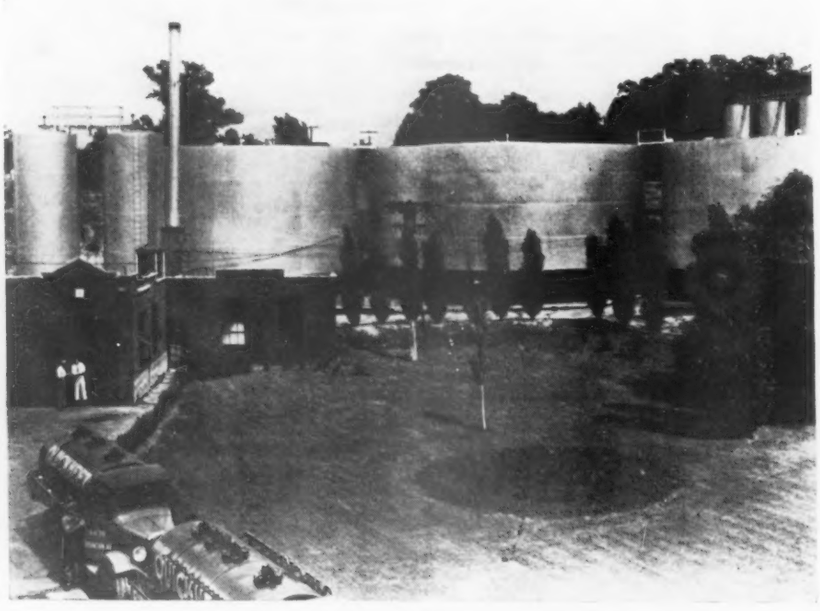
Bulk Fuel Oil Plant Beautified; Neighbors' Feelings Appeased

THE FUEL OIL CO. of St. Louis is particularly proud of its bulk plant and the beginning of this achievement goes back some ten years.

The company, 10 years ago, decided to have sufficient bulk storage to take care of customer requirements for a reasonable length of time in case of refinery shut-downs or a railroad tie-up. So the plant was built, to cover requirements for a minimum of 30 days even in coldest weather.

The plant was in a residential suburb of St. Louis, and naturally there was some resentment at business encroaching on a residential district. So the company, to soften resentment, decided to improve the plant's appearance by planting trees, shrubs and flowers, so it would be a credit to the neighborhood.

"We believe it has helped us, and not only with our neighbors but with our employes," W. F. Schierholz, president, relates. "They have seen that we take pride in the bulk plant surroundings and in keeping our equipment in first class condition, and they also take a pride in their work, with the result that deliveries are more efficiently handled, the men are more careful about their appearance and our customers like us better for the effort."



14,500,000 Miles Without An Accident

CHICAGO, Dec. 27.—Panhandle Refining Co. and Cities Service Oil Co. were leaders during the first four months for the oil industry in the national fleet safety contest the National Safety Council reports.

The contest started July and continues for a year, and 160 of the 1025 fleets enrolled in the first four months traveled 14½ million miles, or 580 trips around the world, without an accident.

In the petroleum division the Panhandle fleet for central Texas division was leader in the large fleet. Cities Service, Grand Forks, N. D., division, was the small fleet leader.

Will Enclose Station Lubrication Facilities

S. A. Wassum's Tekamah Oil Co., Tekamah, Neb., is planning to enclose lubrication facilities next year in a one-stop service station.

While making plans this year for the station's improvement, Mr. Wassum has branched out in another line of business, not directly related to oil jobbing but in the line of one of the industry's best customers—trucking. Mr. Wassum has eight trucks hauling gravel and has completed several road graveling jobs this year.

One of the general achievements of this year in northeastern Nebraska, Mr. Wassum reports, is the better credit condition. Years of oil company effort to relieve the credit situation resulted during 1937 in customers seeking financial aid for oil purchases outside the industry and not expecting the oil man to carry the financial burden.

A new one-stop service station is being built by W. E. Scott, of the Scott Oil Co., Decorah, Ia.

Amend Tanker Rules

WASHINGTON, Dec. 27.—Supplement I of the General Rules and Regulations for Tank Vessels has been issued by the Bureau of Marine Inspection and Navigation. The supplement consists of 26 pages of additional and substituted material amending the edition of Nov. 10, 1936. Inspectors will issue the supplement to shipbuilders and others concerned in their respective districts.

Mr. Distributor...

MEET AND BEAT COMPETITION WITH THESE SURE-FIRE CITIES SERVICE SALES IDEAS!

The cream of pre-tested sales promotion plans available to you

If you're at the end of your rope for new ideas . . . if competition in your territory is burning hot . . . you have no time to lose in experimenting with raw, untried ideas. Let Cities Service solve your problem with new but *pre-tested* ideas.

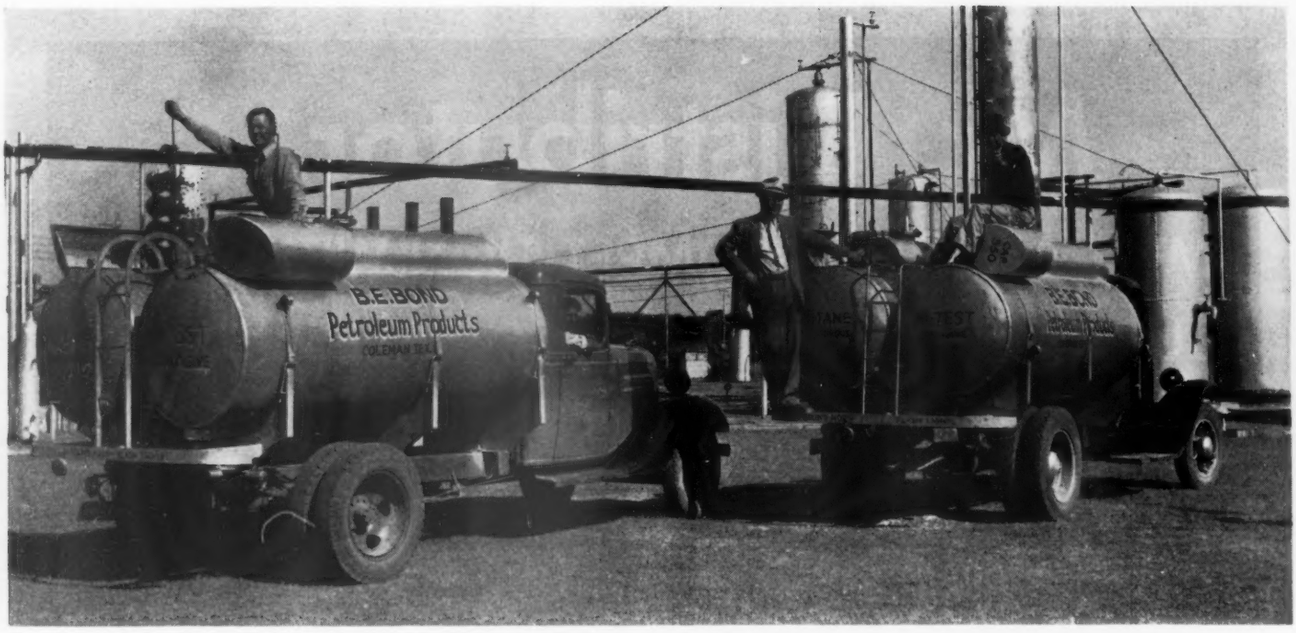
Cities Service salesmen in 38 states have gathered the cream of promotion plans that produce. They have produced profitably for others . . . they will do the same for you. These ideas are a part of the Cities Service Proved Sales Plan that sold millions of gallons of new business during the worst years of the depression. Let it help you meet and beat competition . . . increase your gallonage and profits. Write, wire or 'phone today for more details. Don't let competition get you down . . . mentally or financially . . . when you have a sure-fire means of beating it.

CITIES SERVICE

RADIO CONCERTS . . . *every Friday at 8 P. M. (E.S.T.) . . . WEAF and 43 associated N.B.C. stations*

CITIES SERVICE OIL CO. Detroit, Mich.
CITIES SERVICE OIL CO. Chicago, Ill.
CITIES SERVICE OIL CO. Milwaukee, Wis.
CITIES SERVICE OIL CO. Cleveland, Ohio
CITIES SERVICE OIL CO. Boston, Mass.
CITIES SERVICE OIL CO. New York, N. Y.
CITIES SERVICE OIL CO. Tulsa, Okla.
CITIES SERVICE OIL CO. St. Louis, Mo.
CITIES SERVICE OIL CO., LTD. Toronto, Ont., Canada
CITIES SERVICE OIL CO. Shreveport, La.

CITIES SERVICE OILS AND GASOLENES



These two trucks are used for hauling butane from the Texas Panhandle to drilling wells in the West Texas oil fields. The separate twin tanks are mounted on cradles and held in place by straps. The covers for the connections on top of the tanks are shown turned back. These trucks each carry 1100 gallons, the maximum load permitted by Texas. The small "well" for the unloading line can be seen at the bottom rear of each tank

Butane Markets by Trucking From Gasoline Plants

THE use of butane for fuel in drilling operations, practice that came in by way of California, has swept into amazing popularity in the Mid-Continent in the past three years. Conservative estimates place current consumption of this natural gasoline plant product for that purpose at over 600,000 gallons a month.

Only a step behind this market among the drilling contractors in the Mid-Continent, many observers see another and broader use of this particular petroleum product in industrial and domestic use. Underground storage systems for butane have recently been installed in a number of homes and larger buildings within truck hauling distance of natural gasoline plants. Two or three truck operators have been active sellers of the storage units.

Underground installations are necessary because butane does not vaporize properly when the temperature is much below the freezing point. The cost of the underground unit, it is said, is lower than the average "bottled gas" installation and the lower cost of the fuel by this method of delivery and storage is said to permit its use for both cooking and general heating purposes.

More than a dozen specially constructed transport trucks now are operated on butane delivery schedules as regular as that of the milk man.

By **ALLEN S. JAMES**
N. P. N. Staff Writer

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From gasoline plants in Kansas, Oklahoma, New Mexico and the Texas Panhandle these trucks make regular trips to scores of drilling rigs in the Mid-Continent.

No matter how isolated nor rough the trail to the drilling site, the trucks keep the storage tanks at the location sufficiently supplied to permit uninterrupted drilling operations.

Recently the practice has spread from the Mid-Continent eastward to the new Illinois field. At least one company already has started transporting butane by truck from a Seminole, Okla. natural gasoline plant to its drilling rigs in the vicinity of Olney. The fact that many of the rigs now being used in Illinois were moved there from the Mid-Continent and already were equipped to use butane probably accounts in part for the demand.

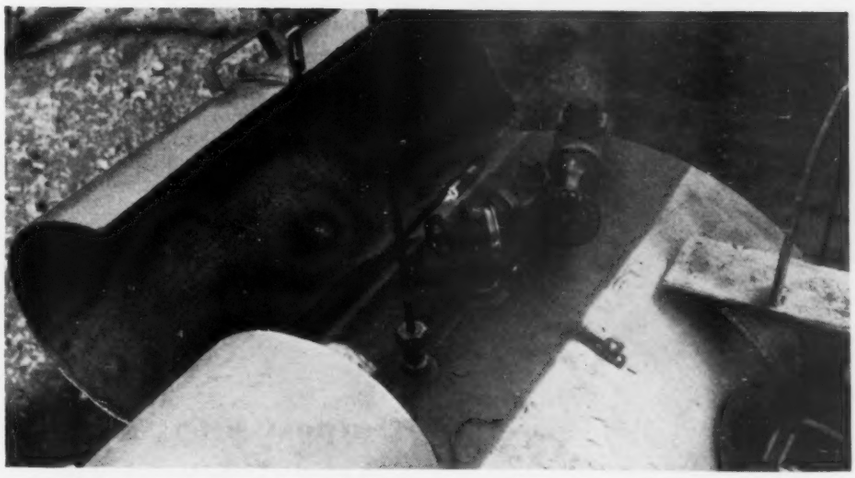
The internal combustion engines furnishing power for some of the drilling rigs use from 200 to 600 gallons of butane a day. Other engines, however, require from 900 to 1500 gallons daily. In Kansas alone, it has been reported, more than $1,000,000 worth of new equipment designed to use butane for fuel has been placed in use in the past three years.

Drilling contractors operating in semi-arid areas where the relative scarcity of water all but prohibits the use of steam for power have been the strongest boosters and largest users of butane. Another reason for its growing popularity is the fact that an engine equipped to use butane can be converted quickly and at no additional cost into a natural gas or a gasoline burning power plant. The engines accordingly can be more easily adapted to any operating conditions encountered in the drilling fields.

MOST of the butane now being hauled by truck from Mid-Continent natural gasoline plants is handled by two transport trucking companies. Both have headquarters in Tulsa.

The pioneer in the field is B. E. Bond & Co. and running a close second is R. J. Allison Co., Inc. Mr. Bond is credited with having operated the first gasoline transport truck in Oklahoma. One of his trucks also hauled the butane for the first drilling operation by that method in Oklahoma, when the Stanolind Oil & Gas Co. three years ago borrowed the idea from California and gave it a trial.

The Bond company's butane trucking at that time amounted to approxi-



With cover thrown back the valves and gauges on the truck tank are reached easily by the driver. In the picture can be seen the tank gauge on which B. E. Bond holds a patent, the pressure gauge and next to it the vapor return line. The other valve is for the unloading and loading line

mately 27,000 gallons a month for that first drilling operation. At present the company handles approximately 350,000 gallons a month.

Both trucking companies have specially designed truck tanks and auxiliary equipment because, in view of the fact that the highly volatile nature of butane, it cannot be transported in an ordinary liquid fuel truck tank. Both companies require their tanks and equipment to stand 200 pounds pressure before accepting them for service with the butane fleet.

The Bond company has standardized on twin tanks for each truck. The Allison company at first used specially designed single tanks but more recently has swung to the twin tanks on several of its trucks.

FEDERAL and state regulations require tanks to be filled not more than 90 per cent, thus leaving a minimum of 10 per cent for expansion. The Bond company found that by leaving the 10 per cent space in the tanks there was considerable sloshing, particularly on hills and when starting and stopping. The "Wash" in the tanks sometimes was so great the trucks "jumped."

Mr. Bond and J. F. Nagle of the Skelly Oil Co., working together, finally devised a tank which permitted shell-full filling and yet still had space for expansion. The plan called for the welding, on top of the tank, of an "expansion chamber" which provided a minimum of 12 per cent of the tank's area for expansion. The expansion of the butane into the expansion chamber was through holes drilled in the tank top underneath the chamber.

Both trucking companies have been particularly cautious about equipment on the tanks. Piping outside the tanks has been held to a minimum, and no connections protrude where there is danger of their being knocked off. Still another precaution is the placing of check valves in all loading and unloading lines, these valves being placed within the tank wherever possible. High pressure, 2-inch hose is used to connect the unloading line with the pump mounted the truck chassis and to connect the discharge end of the pump with the storage tank loading line.

Mr. Bond has carried his safety measures to the point where all loading and unloading connections, vapor return line connection, gauge stick and pressure gauge and relief valve are placed on top of the truck tank. This exterior equipment, except when actually in use, is protected by a cover made of the same grade of steel that forms the expansion chamber.

The diameter of all of the Bond company's tanks is 38 inches although the length varies with the size of the truck chassis. The company found that 38 inches diameter was about the largest that could be used safely without having to go to a different grade of steel, which would run the tank cost up considerably.

The capacities of the transport trucks operated by the two companies range from approximately 600 gallons up to 2400 gallons. Some of the trucks are equipped with winches so that they can be pulled out under their own power any time they get stuck in sand or mud.

All the truck tanks have vapor return lines, which connect with the vapor lines in the storage tanks. In this way there is no loss in loading or unloading the tanks. Of course to prevent loss the drivers are required to inspect all connections to see they are vapor tight. The truck drivers are instructed not to unload into a storage tank at a drilling site until after they have made a thorough inspection of the equipment.

The drilling contractors furnish the storage tanks. All the tanks are tested for 200 pounds pressure. Some of the storage tanks hold as much as 8000 gallons, but most of them will hold approximately 4000 gallons, with a few running around 1500 to 2000 gallons. The size of the drilling rig governs to some extent the size of the storage tank.

THE relief valves on the storage tanks generally are set to "pop" at 105 pounds pressure. The valves on the tank trucks, however, are set to relieve pressure whenever it reaches 100 pounds per square inch.

The Bond company operates as a common carrier, a contract hauler and a dealer in butane. It is the only butane transporting company in the Mid-Continent and, according to reports here the only one in the country, to hold a common carrier permit from the Interstate Commerce Commission, having qualified for the permit under the so-called "grandfather clause."

In addition to hauling butane for others, the Bond company also buys large quantities from natural gasoline manufacturers and resells it, both to drilling contractors and to owners of underground storage systems using butane in homes and other buildings. Capacities of these underground sys-

Side view of one of the large transport trucks owned by B. E. Bond & Co. shows the expansion chamber on top of the regular tank. At the rear top can be seen the two hinges which hold in place the cover over the connections and gauges. This unit has twin tanks

The method of connecting the pump is shown in this picture of a single tank butane transport unit. A short length of high pressure hose leads from the tank loading-unloading line to the pump shown mounted on the side of the chassis. Another length of hose is attached to the discharge side of the pump. Note the spot light just above the pump. Fumbling in the dark is too great a risk when handling butane

tems, it was reported, range from 300 to 4600 gallons.

The R. J. Allison company confines its activities to intrastate contract hauling and to buying butane and distributing it in wholesale quantities. Since the company was not hauling butane in time to obtain an ICC permit under the "grandfather clause", it has established its own bulk stations. In this way the company can buy butane in one state, haul it in its own equipment to the bulk station in another state and redistribute it from that point.

The Allison company also has equipped some of the motors in its butane transport trucks to burn that fuel and now is collecting and compiling comparative data on operating costs between gasoline, diesel fuel and butane operated trucks in its transport fleet.

One of the major manufacturers of combustion engines last June issued a bulletin prepared by its engineering department, listing equipment required for operating its engines on butane. It is interesting to note some parts of the bulletin.

"Butane, a liquefied petroleum gas," the bulletin states, "has every desirable characteristic of gasoline when used in internal combustion engines; and furthermore possesses additional advantages obtainable with no other motor fuels. An octane rating of 93 permits the use of high compression ratios resulting in increased thermal efficiency, increased power output, and a corresponding decrease in specific fuel consumption."

The bulletin also states that fuel consumption under normal operating conditions will average 0.09 gallon per HP/hr. for full load; 0.10 gallon per HP/hr. for 75 per cent load; 0.11 gallon per HP/hr. for 50 per cent load, and 0.13 gallon per HP/hr. for 25 per cent load.

One of the most recent fuel consumption comparisons obtainable here shows that two new engines placed in service in the Illinois field, on the basis of four days of operation, required an average of 600 gallons of butane each, whereas these engines had previously used 590 gallons daily of Ethyl gasoline. While the consumption of butane may be slightly higher, it was pointed out, the lower cost of that fuel more than offset the difference in consumption.

At the present time butane is sold at the natural gasoline plant in truck quantities at prices ranging from 2.5 to 4 cents a gallon. The cost to the drilling contractor varies to take into account such factors as length of haul to the rig and road conditions prevailing there.

Baffle Provides One Or 3 Compartments

With a 1000-gallon fuel oil tank truck purchased by the Jamieson Oil Co., Omaha, the company now has three trucks in fuel oil service and is making a special sales effort to increase this end of the jobbing business to counterbalance the gasoline department.

Two features of the truck are the meter and the installation of baffle plates that can be permanently plugged to from three compartments.

When the company was considering the purchase the question came up of having one or three compartments. Much was to be said for both sides, especially having only the one big compartment since the company handles No. 3 oil mainly and deliveries were to be metered.

Final decision, since baffle plates were required anyhow, was to make the 1000-gallon tank in one compartment but the baffles were so constructed that three compartments—500, 300 and 200 gallons each—can be arranged quite easily.

At the bottom of each baffle is a 4-inch opening, at the top a 2-inch opening for the surge of oil and air. By plugging the top and bottom openings, reached through the three 12-inch tank openings, the truck can have three compartments.

Arrangement of fill lines at the bulk plants permits loading the truck through two lines.

Outpost Ethyl Pump Near Arctic Circle

NEW YORK, Dec. 27. — The first Ethyl pump in the Polar regions has been installed at Fairbanks, Alaska, 115 miles from the Arctic Circle, reports C. J. McFarlane, Calgary representative of the Ethyl Gasoline Corp.

The effects of antiknock gasoline on engine operation and the relation of high-octane fuel to high compression motors were demonstrated recently by McFarlane at a meeting of 40 Alaskan aviation and automotive experts in the Fairbanks offices of the Pacific Alaska Airways. McFarlane flew to Fairbanks from Edmonton, Alberta, with Ethyl fluid and mixing equipment.

"The North country will see a great deal of activity in the near future," Mr. McFarlane predicts. "The northwest route from Canada to the Orient is 4000 miles shorter than the present one from Oakland, Calif., and over land a large part of the way."

Exports Up 50% Over Year Ago

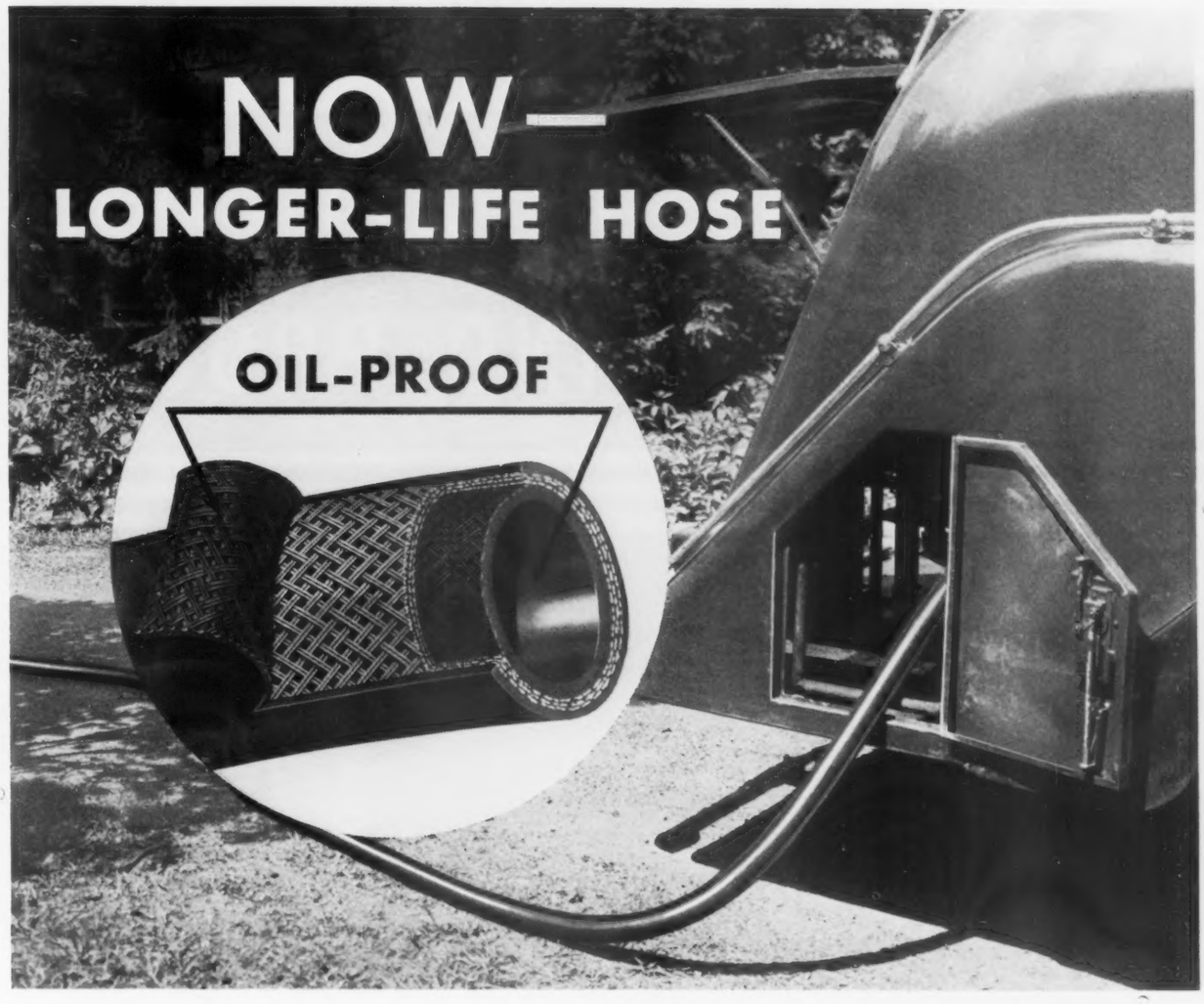
WASHINGTON, Dec. 27.—October exports of petroleum and products were more than 50 per cent above those for October, 1936, according to figures released by the Bureau of Foreign and Domestic Commerce.

October, 1937, exports were $35,086,438, compared with a total of $22,496,183 in October a year ago.

Crude exports alone, 6,648,907 barrels, accounted for $8,881,629 of the total value, compared with exports of 4,708,329 barrels of crude in October, 1936, valued at $6,268,689.

Other principal items on the petroleum export list in October, 1937, included: gasoline, 2,867,794 barrels, $8,632,326; kerosine, 681,316 barrels, $1,812,136; gas oil and distillate fuel oil, 2,445,695 barrels, $3,775,385; residual fuel oil, 982,056 barrels, $896,797.

Comparable figures for October, 1936, exports: gasoline, 1,753,396 barrels, $4,533,512; kerosine, 564,682 barrels, $1,194,061; gas oil and distillate fuel oil, 1,696,467 barrels, $2,130,238; residual fuel oil, 543,086 barrels, $459,826.



Try this New "Electric-DB" in fuel oil duty THIS WINTER —you will want its economy on every truck next season

In the busy months left this Winter you have an opportunity to put the revolutionary new Electric-DB Fuel Oil Reel Hose to a real test. You can judge for yourself whether we are overstating when we say to you:-

1. This new delivery hose . . . with its OIL-PROOF COVER AND TUBE made of the famous Neoprene-base compound developed and perfected by Electric Hose & Rubber Co. . . . promises to *outlast any hose you ever used.* Yet, it costs only a little more.

2. It ends a major part of those troubles which hasten the day of replacement, and handicap your operating efficiency.

Even if you should require a large amount of replacement hose to carry you through this season, you will take no gamble by making it all "Electric-DB". For over three years, the Neoprene-base compounds developed by "The Hose Specialists" have met actual gasoline and oil service in the hands of hundreds of concerns . . . and set economy records in every case.

Write us now for prices and all the facts about this hose that has a tube that won't slough-off, disintegrate or be harmed by swelling . . . a cover that won't swell harmfully or lose its toughness; that defeats blistering, peeling, gouging, abrasion . . . an extra-flexible braided construction.

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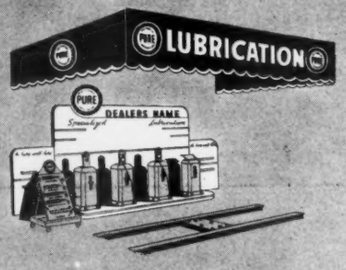

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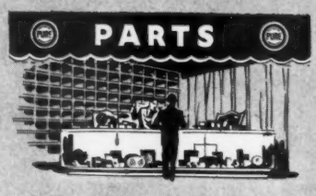

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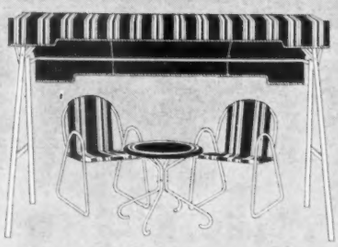

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NEW EQUIPMENT

And the Manufacturer

Demonstration Motor

A demonstration motor which is said to illustrate the advance in automotive power and performance has been developed by engineers of Ethyl Gasoline Corp. The motor consists of a single cylinder, four-cycle engine originally manufactured as a farm light unit. The compression ratio, however, has been raised to approximate the ratios of modern motor cars.

Power output is dissipated through a generator and resistance coils and is recorded on a wattmeter. While knocking is audible in most instances, it is also recorded visually by lights activated through the Midgley bouncing pin. When ordinary gasoline is used the motor knocks, the temperature rises, and horsepower and speed drop off. Substitution of Ethyl gasoline at the same load is shown to eliminate detonation, with accompanying speed and horsepower pick-up and fall of temperature.

* * *

Buckeye Iron & Brass Works, Dayton, Ohio, announces the addition of W. B. Anderson, son of Vice-President R. C. Anderson, to its sales staff. He represents the fourth generation with the company, being great grandson of the founder.

* * *

Synthetic Hose

A new addition to its line of hose has been announced by the Goodyear Tire & Rubber Co. This new hose is a vertical braided, lead cured, synthetic tube product with an outer cover also of synthetic rubber.

It is claimed to be highly resistant to the action of oil and gasoline, both inside and out, and is said to be well fitted as a fuel oil reel hose either for tank trucks or for servicing airplanes at airports. Static electricity is dispersed through a copper wire braided into the cord body of the hose and grounded to the metal hose connections. The new hose is known as Style B H Fuel Oil-Gas hose.

* * *

NEW YORK, Dec. 27.—The U. S. Supreme Court has upheld the patent right of the American Flange and Manufacturing Co., New York, to manufacture and supply a mechanically inserted closure for steel drums, in denying the Byrne Manufacturing Co. a review of a circuit court finding of patent infringement.

The patent, No. 1,513,637, known as the Schwartz patent, covers a pressed-in type of bushing or flange for metal containers, as well as a combination of such flange with a metal container. This bushing or flange is non-rotatably seated in the bunghole and sealed in place by the portion of the bushing near its end being rolled around the edge of an annular flange surrounding the bunghole.

In another recently terminated action the American Flange company secured judicial valuation of its patents Nos. 1,513,637, 1,513,638, 1,887,435, 1,951,491, 1,982,144, 1,982,145. Other actions of the company alleging infringement of patents are pending.

New Patents

Compiled by R. E. Burnham, patent and trademark attorney, 511 Eleventh Street, N. W., Washington, D. C., from whom copies may be obtained at the rate of 25c each. State number of patent and name of inventor when ordering.

October 19, 1937
REFINING

Conversion of hydrocarbon oils — Charles H. Angell, Chicago, Ill., assignor to Universal Oil Products Co. Filed Feb. 27, 1933. No. 2,095,952.

Process for distilling pressure tar—Otto Behimer, Chicago, Ill., assignor to Texas Co. Filed Feb. 10, 1928. No. 2,095,963.

Solvent extraction in successive operations—Warren F. Faragher, Woodbury, N. J., assignor to Houdry Process Corp. Filed Mar. 7, 1934. No. 2,095,972.

Process of improving light hydrocarbons—Roland B. Day, Chicago, Ill., assignor to Universal Oil Products Co. Filed Apr. 29, 1931. No. 2,096,163.

Treatment of hydrocarbon oils—Jean D. Seguy, Chicago, Ill., assignor to Universal Oil Products Co. Filed Feb. 11, 1931. No. 2,096,204.

Conversion of hydrocarbon oils—Kenneth Swartwood, Chicago, Ill., assignor to Universal Oil Products Co. Filed June 28, 1935. No. 2,096,210.

Process of cleaning dirty oil—Lawrence S. Wilbur, Evanston, Ill. Filed Apr. 28, 1933. No. 2,096,220.

Converting residuum into charging stock and coke—Fred C. Koch, Wichita, Kans., assignor to Winkler-Koch Patent Co., same place. Filed July 10, 1930. No. 2,096,589.

Art of recovering hydrocarbons—Reading B. Smith, Whiting, Ind., assignor to Sinclair Refining Co. Filed Nov. 14, 1931. No. 2,096,700.

MISCELLANEOUS

Liquid fuel — Vanderveer Voorhees, Hammond, Ind., assignor to Standard Oil Co. (Ind.) Filed Oct. 31, 1935. No. 2,096,218.

Apparatus for dislodging filter cake from filters—Daniel B. Banks, Drexel Hill, and Paul D. Barton, Merion, Pa., assignor to Sun Oil Co. Filed Oct. 2, 1935. No. 2,096,314.

Compounded lubricants — Arthur W. Burwell, Niagara Falls, N. Y., and Adolf Kempe, Hackensack, N. J., assignors to Alox Corp. Filed Dec. 27, 1934. No. 2,096,390.

Cutting and drawing oil—George W. Cupit, Jr., Woodside, N. Y., assignor to General Chemical Co. Filed Apr. 20, 1934. No. 2,096,449.

October 26, 1937
REFINING

Process of refining mineral oils—Chester E. Andrews, Overbrook, and Merrell R. Fenske, State College, Pa., assignors to Rohm & Haas Co. Filed June 13, 1935. No. 2,096,725.

Treatment of hydrocarbon oil—Hans Tropsch, Chicago, Ill., assignor to Universal Oil Products Co. Filed Dec. 24, 1934. No. 2,096,769.

Treatment of hydrocarbon oils — Warren F. Faragher, Chicago, Ill., assignor to Universal Oil Products Co. Filed Jan. 26, 1931. No. 2,096,798.

Treatment of hydrocarbon oils—Edwin F. Nelson, Chicago, Ill., assignor to Universal Oil Products Co. Filed Aug. 14, 1933. No. 2,096,820.

Production of lubricating oil dye stocks by contacting risudua—Malcolm Maxwell, Baytown, Tex., assignor to Standard Oil Developmnet Co. Filed Oct. 23, 1935. No. 2,096,909.

Refining pressure tar—Robert E. Wilson, Chicago, Ill., assignor to Standard Oil Co. (Ind.) Filed July 5, 1932. No. 2,096,949.

Refining mineral oils—Robert E. Wilson, assignor to Standard Oil Co. (Ind.) Filed Oct. 6, 1932. No. 2,096,950.

Process and apparatus for production of light hydrocarbons—Arthur D. Smith, Park Ridge, Ill., assignor to Jenlins Petroleum Process Co. Filed June 19, 1936. No. 2,097,084.

Process of refining oils—William T. Hancock, Long Beach, Calif. Filed Sept. 23, 1935. No. 2,097,097.

Lubricating oil and method of treating (dewaxing) — Robert E. Manley, Beacon, N. Y., assignor to Texas Co. Filed Apr. 23, 1934. No. 2,097,127.

Still—James E. Branson, Cincinnati, Ohio, assignor to Dry Cleaning Equipment Co., same place. Filed Dec. 21, 1934, No. 2,097,364.

Process for producing gasoline — James J. Hogan, Whiting, Ind., assignor to Standard Oil Co. (Ind.) Filed Feb. 1, 1935. No. 2,097,412.

MISCELLANEOUS

Treatment of motor fuel—Vasili Komarewsky, Chicago, Ill., assignor to Universal Oil Products Co. Filed Apr. 30, 1934. No. 2,096,813.

Recovery of phenol from a constant boiling mixture of phenol and water—George T. Atkins, Jr., Baytown, Tex., assignor to Standard Oil Development Co. Filed Oct. 26, 1935. No. 2,096,871.

Bituminous compositions—Charles J. Bitzer, Brooklyn, N. Y., assignor to Standard Oil Development Co. Filed May 25, 1934. No. 2,096,876.

Lubricating oil of high oiliness and resistance to oxidation—Eugene Lieber, Linden, N. J., assignor to Standard Oil Development Co. Filed Aug. 22, 1935. No. 2,096,905.

Insecticidal oil spray — Vanderveer Voorhees, Hammond, Ind., assignor to Standard Oil Co. (Ind.) Filed Feb. 14, 1934. No. 2,096,947.

Soluble oils—Frederick W. Fabian, East Lansing, Mich., and Elmer W. Adams, Hammond, Ind., assignors to Standard Oil Co. (Ind.) Filed Mar. 27, 1936. No. 2,097,085.

Conversion of unsaturated alcohols and/or ethers to their saturated isomers, and treatment of unsaturated halides and products resulting therefrom—Herbert P. A. Groll, Berkeley, and Clarence J. Ott, San Francisco, Calif., assignors to Shell Development Co. Filed July 17, 1933, and May 18, 1935. Nos. 2,097,154 and 2,097,155.

Lubricating oil—John M. Musselman and Herman Lankelma, Cleveland, Ohio, assignors to Standard Oil Co. (Ohio). Filed Sept. 30, 1935. No. 2,097,162.

1938 New Car Lubrication Issue

LATEST developments in hypoids . . . . wider use of oil filters . . . more batteries under the hood . . . importance of regular crankcase oil drains and chassis lubrication!

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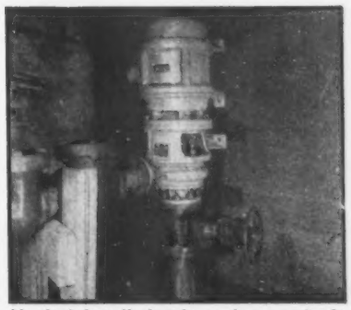
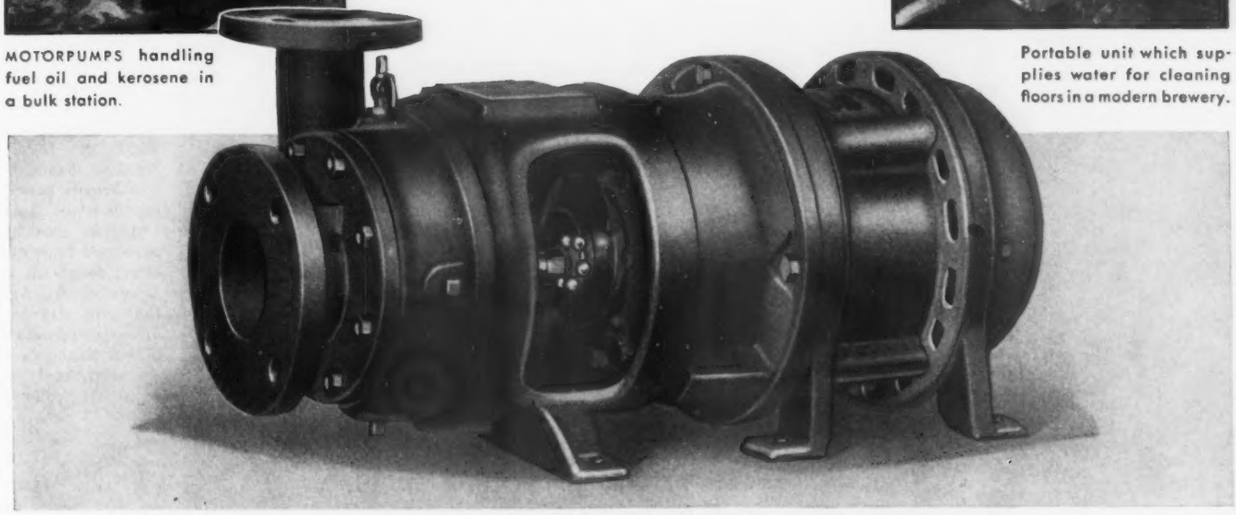


Vertical installation in underground pit. Unit furnishes water for general supply service in a dairy.

MOTORPUMPS handling fuel oil and kerosene in a bulk station.

Portable unit which supplies water for cleaning floors in a modern brewery.



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Gasoline Price Drop Cuts Profits Of Ashland Oil

CLEVELAND, Dec. 27.—The recent general decline in gasoline prices will decrease earnings of the Ashland Oil & Refining Co. about $25,000 per month and the prospects for the oil industry, from a short-range viewpoint are not encouraging, Paul W. Blazer, president of the company, said last week in a letter to stockholders.

The company paid a quarterly dividend of 10 cents per share on common stock.

Preliminary figures indicate consolidated net earnings for the company of $654,865 for the first 11 months of 1937. This is equivalent to 66.5 cents per share. The letter continued:

"In our opinion, prospects for the oil industry, from a short-range viewpoint, are not encouraging . . .

"The recent general decline in gasoline prices will affect our profits to the extent of about $25,000 per month. Present market conditions projected over 1938 indicate our earnings for next year would be reduced to approximately 40 cents per share. (1937 earnings were estimated at 70 cents). We anticipate, however, that recent investments in new facilities will enable us to offset at least a part of the decline in gasoline prices. We believe that our relative position in the industry is stronger than ever before."

Half Ton Bonus

CHICAGO, Dec. 27.—Employes of the Wilson & Bennett Manufacturing Co., makers of steel containers, received more than one-half a ton of silver as a bonus this year.

Just before Christmas, S. A. Bennett, president of the company, called 250 office employes and shopmen into the offices and distributed $15,000 in new silver dollars. They weighed more than one-half a ton. The bonuses ranged from $5 to $300, depending on the recipient's years with the company.

New Crude Posting

LOS ANGELES, Dec. 24.—Posted prices for crude oil in the Greeley and Canal fields, Kern County, were announced Dec. 22 by Standard Oil Co. of California, principal producer in the area. The new offerings range from 84 cents for 27 degree gravity to $1.64 for 48 gravity and above.

The Canal field is located about six miles southwest of the center of the Greeley play, which is about 20 miles west of Bakersfield. A full schedule of prices offered for crude in these fields is shown elsewhere in this issue of NATIONAL PETROLEUM NEWS.

Santa In Person Passes Out Bonus Checks

Five thousand persons attended the Christmas party in front of the Continental Oil Co.'s headquarters building in Ponca City, Okla., the night of Dec. 15 and watched Santa Claus and two helpers pass out $200,000 in bonus checks to 1700 employes; incidentally, they consumed huge quantities of cider, doughnuts and coffee. Bonus checks were mailed the same day to employes away from Ponca City. All told $770,000 bonus money was distributed by the company

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Markets

At A Glance . . .

MID-WESTERN: Kerosine in good demand; offerings limited.

MID-CONTINENT: Refined gasoline quiet; natural steadier.

PENNSYLVANIA: Gasoline lower; fuel oil higher.

CALIFORNIA: Majors and independents slash fuel oil prices.

EASTERN SEABOARD: Major suppliers meet Socony reduction.

GULF COAST: Cargo trading light; prices steady.

Mid-Western

Kerosine Active

N. P. N. News Bureau

CHICAGO, Dec. 27.—Inactivity ruled the Mid-Western gasoline market Christmas week. A pre-holiday buying lull, coupled with inclement weather resulted in few gasoline sales in the open market, sellers said.

Gasoline prices were easy throughout the week. Offerings of all grades were free. Price shading on low and high octane grades was heard at various times.

Straight run gasoline in Michigan was freer, refiners reported. Sales for shipment within the state, however, were at 5.25 cents and up. For shipment outside of Michigan, this grade was reported offered as low as 4.5 cents.

Kerosine and range oil were active. Offerings were limited. This was especially true of the latter product.

One refiner purchased a relatively small quantity of range oil from a Chicago seller at 4.125 cents, and was said to be seeking additional supplies.

Continued curtailment of crude runs in Michigan has resulted in a shortage of kerosine there. Some sellers advanced prices 0.25 cent late last week.

Mid-Continent

Gasoline Demand Light

N. P. N. News Bureau

TULSA, Dec. 27.—Mid-Continent markets were quiet the week before Christmas as most jobbers withdrew from active participation. Jobbers had purchased sufficient supplies to cover current needs, reports indicated, and desired to keep inventories low over the year-end.

With demand light, Mid-Continent refiners generally hesitated to push gasoline into the open market. Most shipments were against contracts and to local customers. Gasoline prices were largely nominal.

After a 0.5-cent reduction the previous week, natural gasoline prices steadied last week. Sales of Grade 26-70 at 3 cents f.o.b. Group 3 and Breckenridge were more numerous. Buying cleared the market of most surplus and manufacturers said they ended the week with little material on hand.

Kerosine and range oil were in good demand. Wider use of oil for ranges has increased demand for untreated kerosine or any product of similar specifications. Supplies of finished and untreated kerosine were closely held by some refiners in efforts to build up inventories of tractor fuel stock. Several refiners and brokers were paying 4.125 cents, Group 3, for 41-43.

Renewed reports of low-priced offerings of bright stock and neutral oil were encountered last week. Offerings centered around the Kansas City area, several refiners said. These reports could not be confirmed. Mid-Continent manufacturers continued to quote unchanged prices for lubes.

N.P.N. Gasoline Index

	Dealer T.w. Cents	Tank Car per gal.
Dec. 28	10.27	6.01
Month ago	10.30	6.21
Year ago	10.21	6.32

Dealer index is an average of "undivided" dealer prices, ex-tax, in 50 cities.

Tank car index is a weighted average of 13 wholesale markets for regular-grade gasoline.

Pennsylvania

Gasoline Lower

N. P. N. News Bureau

CLEVELAND, Dec. 27.—Gasoline, 65 and above octane, dropped 0.25 cent in the lower and upper Pennsylvania fields last week.

U. S. Motor gasoline also moved at lower prices, declining 0.125 cent to 4.75 cents, f.o.b. lower field refineries.

The higher octane gasoline decline followed a 0.5-cent reduction in Ohio retail and tank wagon markets.

Fuel oil, 36-40 gravity, continued scarce and the limited quantities available for open market spot shipment sold 0.125 to 0.25 cent above the previous week's prices. Kerosine was steady.

Bright stock was firm at 15 cents for 25 pour test, No. 8 color.

Three buyers were in the market for 600 steam refined cylinder stock, but information on any completion of sales was lacking as the week ended.

Trading in neutral oils and white crude scale wax was quiet, according to the majority of marketers.

California

Fuel Oils Quoted Lower

N. P. N. News Bureau

LOS ANGELES, Dec. 24.—California major and independent suppliers of light and heavy fuel oils met a buyer's strike against prevailing posted prices by reducing quotations 10 cents per barrel at Pacific Coast points, except in the San Joaquin Valley where quotations were reduced 15 cents.

Including quotations on Grade C fuel oil for bunkering purposes, the cut was expressed as an attempt to line up large buyers on 1938 contracts.

Small independents made no change in their quotations on fuel oil for domestic consumption. For a heavy grade, quotations by this group ranged from 65 to 70 cents for high sulfur product and 77.5 to 85 cents for low sulfur. Major and large independents asked $1.00 and $0.975, respectively, for shipment from plants in the Los Angeles Basin.

Kerosine-distillate was reported offered at 3.75 cents and a good grade of gas oil at 3.5. One lot of the latter was sold at $1.45 per barrel.

Some uneasiness in domestic gasoline markets was in evidence as one independent Los Angeles Basin refiner offered 100,000 gallons at 7 cents, exclusive of all tax. Another lot of 18,000 gallons was reported sold by another plant at the same price. Although this gasoline was understood to be off specification, it caused retail price signs of 12.5 cents per gallon to appear in the Los Angeles area, as compared with 16.5 cents on major third-grade brands.

California off-shore markets were particularly quiet. One cargo of Japanese navy fuel oil—requiring an addition of about 30 per cent gas oil to

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). Prices in cents per gallon, except heavy fuel oils in dollars per barrel, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included, unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Gasoline *and* Naphtha

Prices Effective	Dec. 27	Dec. 20
OKLAHOMA		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	4.00 – 4.375	4.00 – 4.375
63-66 oct.	4.375– 4.75	4.375– 4.75
67-69 oct.	4.625– 4.875	4.625– 4.875
70-72 oct.	5.00 – 5.375	5.00 – 5.375
60-62, 400 e.p.	*4.00 – 4.375	*4.00 – 4.375
64-66, 375 e.p.	*5.00 – 5.125	*5.00 – 5.125
68-70, 350-360 e.p.	*5.25	*5.25
WESTERN PENNA.		
Bradford-Warren:		
Motor gasoline:		
Min. 65 oct.	‡7.00 – 7.25	*7.25 – 7.50
Other districts:		
54-56 naphtha	‡4.875	*4.875– 5.00
Motor gasoline:		
U. S. Motor (58-62°)	4.75 – 5.00	4.75 – 5.00
Min. 65 oct.	6.75 – 7.25	6.75 – 7.25
CENTRAL MICHIGAN (Prices f.o.b. Cent. Mich. refinery group basis, for shipment within Michigan. Shipments, however, may originate at plants outside Central group).		
Str.-Run Gasoline	*5.00 – 5.25	5.25 – 5.50
64-66 octane gas.	7.75 – 8.00	7.75 – 8.00
68-70 octane gas.	8.125– 8.50	8.125– 8.50
*Excluding Detroit shipment.		
CALIFORNIA (3c tax to be added to prices if used in state)		
U. S. Motor:		
54-58, for instate shipment	7.00 – 9.25	7.75 – 9.25
54-58, for outside state shipment	8.00 – 9.00	8.00 – 9.00
58-61, 375-400 e.p., 65 oct. & above	8.75 – 9.75	8.75 – 9.75
†**N. TEX.** (For shipment to Texas and N. Mex. destinations; Group 3 prices quoted on northern shipments).		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	*4.50 – 4.875	*4.50 – 4.875
63-66 oct.	*5.00 – 5.375	*5.00 – 5.375
67-69 oct.	*5.375– 5.75	*5.375– 5.75
70-72 oct.	*5.625– 6.00	*5.625– 6.00
60-62, 400 e.p.	*4.625– 4.875	*4.625– 4.875
KANSAS (For Kansas destinations only)		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	4.375– 4.50	4.375– 4.50
70-72 oct.	5.375– 5.50	5.375– 5.50
†**W. TEX.**		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	4.625– 4.75	4.625– 4.75
63-66 oct.	5.125– 5.25	5.125– 5.25
67-69 oct.	5.50 – 5.625	5.50 – 5.625
70-72 oct.	5.875	5.875
†**E. TEX.**		
60-62, 400 e.p.	*4.125– 4.25	*4.125– 4.25
N. LA. (For shipment within La. & into Ark.)		
U. S. Motor: (Octane Test L-3)		
62 oct. & below	4.75	4.75
63-66 oct.	5.00	5.00
67-69 oct.	5.25	5.25
70-72 oct.	5.50 – 5.75	5.50 – 5.75
ARKANSAS (For shipment within Ark. & into La.)		
U. S. Motor: (Octane Test L-3)		
62 octane & below	‡4.50	‡4.50
67-69 oct.	‡5.00	‡5.00
OHIO (Quotations of S. O. Ohio. Delivered anywhere in Ohio).		
U. S. Motor	7.75	7.75
Above 65 oct.	8.00	8.00

Natural Gasoline

(Prices are those to blenders on freight basis shown below. Shipments, however, may originate in other Mid-Continent manufacturing districts, such as Panhandle Texas, S. W. Texas or Kans.)

Prices Effective	Dec. 27	Dec. 20
F.O.B. GROUP 3		
Grade 26-70	3.00	3.00

*Nominal.
‡Only one refiner quoting.
†Refiners report they generally receive from 0.25c to 0.5c per gal. more for gasoline & kerosine for local or differential territory shipment.

Prices Effective	Dec. 27	Dec. 20
Natural Gasoline (Cont'd)		
F.O.B. BRECKENRIDGE		
*Grade 26-70	3.00	3.00
CALIFORNIA (F.o.b. plants in Los Angeles basin)		
75-85, 350-375 e.p. for blending	7.50 – 7.75	7.50 – 7.75

Kerosine

WESTERN PENNA.		
Bradford-Warren:		
45 w.w.	5.50 – 5.75	5.50 – 5.75
46 w.w.	5.625– 5.875	5.625– 5.875
47 w.w.	5.75 – 6.00	5.75 – 6.00
Other districts:		
45 w.w.	5.375– 5.50	5.375– 5.50
46 w.w.	5.50 – 5.625	5.50 – 5.625
47 w.w.	5.625– 5.75	5.625– 5.75
CENTRAL MICHIGAN (Prices f.o.b. Cent. Mich. refinery group basis, for shipment within Michigan. Shipments, however, may originate at plants outside Central group.)		
47-49 w.w.	5.30 – 5.55	5.30 – 5.55
OKLAHOMA		
41-43	4.125– 4.25	4.125– 4.25
42-44 w.w.	4.25 – 4.375	4.25 – 4.375
KANSAS (For Kansas destinations only).		
41-43 w.w.	4.50 – 4.625	4.50 – 4.625
42-44 w.w.	4.625– 4.75	4.625– 4.75
†**N. TEX.** (For shipment to Texas and New Mexico destinations; Group 3 prices quoted on northern shipments).		
41-43 w.w.	4.375	4.375
†**E. TEX.**		
41-43 w.w.	*4.00 – 4.125	*4.00 – 4.125
N. LA. (For shipment within La. and into Ark.).		
41-43 w.w.	4.50 – 4.625	4.50 – 4.625
ARK. (For shipment within Ark. and into La.).		
41-43 w.w.	‡4.625	‡4.625
CALIFORNIA		
40-43 w.w.	5.75 – 7.00	6.00 – 7.00

Gas *and* Fuel Oils

WESTERN PENNA.		
Bradford-Warren:		
36-40	5.25 – 5.375	5.125– 5.375
Other districts: (Excluding Pittsburgh District Prices).		
36-40	4.875– 5.00	4.875– 5.00
CENTRAL MICHIGAN (Prices f.o.b. Cent. Mich. refinery group basis, for shipment within Michigan. Shipments, however, may originate at plants outside Central group.		
P.W. Distillate	5.25 – 5.50	5.00 – 5.25
No. 3 gas oil, str.	4.75 – 5.00	4.75 – 5.00
U.G.I. gas oil	4.625– 4.875	4.625– 4.875
Fuel Oils (Vis. at 100):		
500-700 Vis.	2.00 – 2.25	2.00 – 2.25
300-500 Vis.	2.25 – 2.50	2.25 – 2.50
100-300 Vis.	2.75 – 3.25	2.75 – 3.25
OKLAHOMA		
No. 1 white	4.125– 4.25	4.125– 4.25
No. 1 straw	4.00 – 4.125	4.00 – 4.125
No. 2 straw	3.875– 4.00	3.875– 4.00
No. 2 dark	3.75 – 3.875	3.75 – 3.875
U. G. I. gas oil	*3.00 – 3.375	*3.00 – 3.375
28-30 zero	*3.50 – 3.75	*3.50 – 3.75
28-30	‡$1.35	‡$1.35
24-26	‡$0.875–$0.925	‡$0.875–$0.925
18-22	*$0.825–$0.875	*$0.825–$0.875
14-16	*$0.80 –$0.85	*$0.80 –$0.85
KANSAS (For Kans. destinations only).		
No. 1 p.w. fuel oil	4.25 – 4.50	4.25 – 4.50
10-14 fuel oil	$0.70 –$0.725	$0.70 –$0.725
N. TEX. (For shipment to Texas and N. Mex.; Group 3 prices quoted on northern shipments).		
No. 1 white	*4.125– 4.25	*4.125
U. G. I. gas oil	2.75 – 2.875	2.75 – 2.875
24-26	$0.85 –$0.875	$0.85 –$0.875
18-22	$0.80 –$0.825	$0.80 –$0.825
N. LA. (For shipment within La. and into Ark.).		
No. 2	3.625	3.625
20-24	$1.10 –$1.15	$1.10 –$1.15
16-20	$0.95 –$1.00	$0.95 –$1.00
10-14	$0.80 –$0.85	$0.80 –$0.85
ARK. (For shipment within Ark. and into La.).		
No. 2	‡4.00	‡4.00
28-30 gas oil, zero	‡3.75	‡3.75
CALIFORNIA		
San Joaquin Valley:		
Heavy fuel	$0.60 –$0.85	$0.60 –$1.00
Light fuel	$0.85 –$0.95	$0.85 –$1.10
Diesel fuel (per gal.)	3.75 – 5.00	3.75 – 5.00
Stove dist. (per gal.)	4.00 – 7.00	4.25 – 7.00
Los Angeles:		
Heavy fuel	$0.65 –$1.00	$0.65 –$1.10
Light fuel	$0.85 –$1.10	$0.90 –$1.20
Diesel fuel (per gal.)	3.50 – 5.00	3.50 – 5.00
Stove dist. (per gal.)	3.75 – 7.00	4.00 – 7.00

Prices Effective	Dec. 27	Dec. 20
Gas and Fuel Oils (Cont'd		
San Francisco:		
Heavy fuel	$1.05	$1.15
Light fuel	$1.15	$1.25
Diesel fuel (per gal.)	5.50	5.50
Stove dist. (per gal.)	7.50	7.50

Note: All above heavy fuels meet Pacific specification 400; light fuel, spec. 300; Diesel fuels, spec. 200; and stove distillate, spec. 100.

Neutral Oils

WESTERN PENNA.

Viscous Neutrals (Viscosity at 70° F.)

200 Vis. (180 at 100°) No. 3 col., 420-425 fl.:		
0 p.t.	22.00 –22.50	22.00 –22.50
10 p.t.	21.00 –21.50	21.00 –21.50
15 p.t.	20.50 –21.00	20.50 –21.00
25 p.t.	18.50 –19.00	18.50 –19.00
180 Vis. (165 at 100) No. 3 col., 410-415 fl.:		
25 p.t.	17.50 –18.00	17.50 –18.00
150 Vis. (143 at 100) No. 3 col., 400-405 fl.:		
0 p.t.	19.00 –19.50	19.00 –19.50
10 p.t.	18.00 –18.50	18.00 –18.50
15 p.t.	17.50 –18.00	17.50 –18.00
25 p.t.	16.50 –17.00	16.50 –17.00

SOUTH TEXAS

Vis. Color		
Pale Oils: (*Vis. at 100° F.; p.t.* 0)		
100 No. 1½-2½	5.00 – 5.50	5.00 – 5.50
200 No. 2-3	6.75 – 7.25	6.75 – 7.25
300 No. 2-3	7.25 – 7.75	7.25 – 7.75
500 No. 2½-3½	8.25 – 8.75	8.25 – 8.75
750 No. 3-4	8.75 – 9.25	8.75 – 9.25
1200 No. 3-4	9.25 – 9.75	9.25 – 9.75
2000 No. 4	9.50 –10.00	9.50 –10.00
Red Oils:		
200 No. 5-6	6.75 – 7.25	6.75 – 7.25
300 No. 5-6	7.25 – 7.75	7.25 – 7.75
500 No. 5-6	8.25 – 8.75	8.25 – 8.75
750 No. 5-6	8.75 – 9.25	8.75 – 9.25
1200 No. 5-6	9.25 – 9.75	9.25 – 9.75
2000 No. 5-6	9.50 –10.00	9.50 –10.00

Note: South Texas red oil prices shown above cover oils with green cast; blue cast red oils are slightly lower in some cases.

MID-CONTINENT (Vis. at 100° F.; F.o.b. Tulsa basis).

(0 to 10 P.P.)

Vis. Color		
Pale Oils:		
60-85—No. 2	5.50	5.50
86-110—No. 2	6.00	6.00
150—No. 3	9.00	9.00
180—No. 3	10.00	10.00
200—No. 3	10.50	10.50
250—No. 3	11.50	11.50
280—No. 3	12.50	12.50
300—No. 3	13.00	13.00
Red Oils:		
180—No. 5	9.00	9.00
200—No. 5	9.50	9.50
250—No. 5	10.50	10.50
280—No. 5	11.50	11.50
300—No. 5	11.75	11.75

Note: Viscous oils, 15-25 p.p., generally are quoted 0.5c under 0-10 p.p. oils. Non-viscous oils, 15-25 p.p., generally are quoted 0.25c under 0-10 p.p. oils. Viscous oils (150-300 vis.), No. 4 color, generally are quoted 0.5c above No. 5 color oils.

CHICAGO (Vis. at 100° F.)

Pale Oils **0 to 10 p.p.:

Vis. Color		
60-85—No. 2	7.25	7.25
86-110—No. 2	7.75	7.75
150—No. 3	10.00	10.00
180—No. 3	11.00	11.00
200—No. 3	11.50	11.50
250—No. 3	12.50	12.50
Red Oils:		
180—No. 5	10.00	10.00
200—No. 5	10.50	10.50
250—No. 5	11.50	11.50
280—No. 5	12.50	12.50
300—No. 5	12.75	12.75

**Viscous oils, 15 to 30 p.p. are quoted 0.5c lower, 60-85 and 86-110 No. 2 non-viscous oils, 15 to 30 p.p., are quoted 0.25c lower. To obtain delivered prices in Chicago, add 0.25c per gal.

Cylinder Stocks

MID-CONTINENT (F.o.b. Tulsa basis).		
Bright Stocks:		
190-200 Vis. at 210° D	19.00	19.00
150-160 Vis. at 210° D:		
0 to 10 p.p.	16.00	16.00
10 to 25 p.p.	15.00	15.00
25 to 40 p.p.	15.00	15.00
150-160 vis. at 210° E	15.00	15.00

THE OHIO OIL COMPANY

GENERAL OFFICES - - - FINDLAY, OHIO

ROBINSON, ILLINOIS TULSA, OKLAHOMA FT. WORTH, TEXAS

Grade C fuel oil—was reported sold at about $1.00, San Pedro. Other quotations remained the same.

Eastern

Gasoline Quiet

N. P. N. News Bureau

NEW YORK, Dec. 27.—Quiet prevailed in eastern seaboard terminal gasoline markets the past week. Kerosine demand was reported lighter than in previous week by some suppliers, but still in satisfactory volume.

Most suppliers, early in the week, met the reductions in consumer and jobber tank car prices of leaded and unleaded gasolines made late the preceding week by Socony-Vacuum Oil Co. This brought the generally quoted tank car price for unleaded 65 octane and above gasoline to 7 cents, f.o.b. New York harbor. Some suppliers had been offering at this price prior to Socony's reduction.

No general changes were made in tank wagon or service station markets during the week, traders said. Socony made no changes in its general tank wagon structure in New York and New England at the time of its cut in tank car prices. Unsettled retail gasoline markets were reported at some Connecticut points. Third grade gasoline at Bridgeport, was selling at 8 gallons for $1.00, tax included. Retail gasoline prices were reported steady in most sections of metropolitan New York City.

Kerosine prices were unchanged at eastern deepwater terminals. Some cutting in peddler prices was reported at some New England points.

Coastal

Cargo Markets Inactive

N. P. N. News Bureau

NEW YORK, Dec. 27.—Buying in the open cargo market at the Gulf was reported at a standstill the past week, a situation not unusual the week before Christmas, traders said.

The general crude market situation continued to plague coastal refiners and furnished the chief topic of interest. Some felt that a crude price cut might be expected now that the Sunday shutdown plan had apparently been dismissed in Texas. However, others felt that crude production would be curtailed in some manner and that prices would remain unchanged.

Export gasoline prices were unchanged. However, traders generally reported the market was steady at the prices reached in the previous week. No cargoes of 64-66, 375 e. p. gasolines were reported offered at under 5.25 cents, f.o.b. the Gulf. High octane grades of gasoline were said to be in better position than the low octane grades.

Fuel oil was quiet. Traders reported that No. 2 oil was more freely offered at 4.5 cents, although no sales were reported at under that figure. No. 4 oil was reported sluggish. Demand for heavy fuel was quiet. Quotations for Grade C bunker oil continued mostly at $0.85, f.o.b. the Gulf.

Fuel Oil . . . . .

CHICAGO, Dec. 27. — Mid-Western fuel oil market was featured by fair to good demand for light oils, while heavy fuels were slow.

The virtual cessation of industrial demand for heavy fuel has resulted in substantially increased inventories, refiners reported. Offerings were free.

In Michigan, refiners were making larger cuts in crude runs because of insufficient storage for heavy fuel. One smaller refiner was said to have 32 cars of heavy oil loaded on siding. Michigan refiners admitted they could be "tempted" to sell heavy fuel at almost any price to relieve their storage situation.

Demand for light fuels slowed down somewhat before the holiday. Milder weather has curtailed consumption, sellers said. Prices for Nos. 1, 2 and 3 oils were steady, however.

* * *

NEW YORK, Dec. 27.—Moderately active demand for light fuel oils was reported at most northern seaboard terminals the past week. Temperatures generally were higher than in the preceding week and this had its effect on tank car and barge movement, suppliers said.

Scattered reports of price shading in retail fuel oil markets were heard but in general prices were steady. No price changes were reported in tank car markets at eastern terminals. Establishment of New Haven as a deepwater price basing point by some companies has unsettled market in parts of Connecticut, several distributors reported.

* * *

TULSA, Dec. 27. — Mid-Continent light fuels were in good demand from northern distributors and Mid-Continent brokers. In efforts to obtain additional quantities of Nos. 1, 2 and 3 oils, some brokers were offering to pay the same prices which some refiners quoted to jobbers. Higher prices were bringing out more supplies. Heavy fuels were accumulating at some plants, reports indicated. At least one railroad has cancelled an order for heavy fuel. Other roads were taking out the minimum amounts specified in their contracts, refiners said.

Wax

Scale Dull

NEW YORK, Dec. 27.—Christmas holiday did nothing to dispel the dullness which has prevailed in the crude scale wax markets for many weeks. Traders generally reported that buying, for both spot and deferred shipment, continued light. There appeared to be little change in prices. Quotations for 124-126 white crude scale were mostly at 2.8 to 2.9 cents, New York basis.

The market for fully refined waxes also showed little change during the week. Buying was fairly steady, suppliers reported.

TANK WAGON MARKETS, HEATING OILS

Prices in Effect Dec. 27, 1937

Following are tank wagon prices of various grades of heating oil at the points shown in various territories. Prices are in cents per gallon.

	No. 1	No. 2	No. 3	No. 4
S. O. NEW JERSEY				
Newark, N. J.	*	7.00	7.00	7.00
Atlantic City, N. J.	*	7.00	7.00	7.00
Baltimore, Md.	8.00	7.00	7.00	7.00
Washington, D. C.	8.50	7.75	7.75	7.75
SOCONY-VACUUM OIL CO. INC. (S. O. New York Division)				
New York City	*	7.50	7.50	7.50
Albany, N. Y.	*	7.50	7.50	7.50
Rochester, N. Y.	*	7.50	7.50	7.50
Boston, Mass.	*	7.00	7.00	7.00
Bangor, Me.	*	8.00	8.00	8.00
Manchester, N. H.	*	8.00	8.00	8.00
Burlington, Vt.	*	8.00	8.00	8.00
Hartford, Conn.	*	7.00	7.00	7.00
New Haven, Conn.	*	7.00	7.00	7.00
Providence, R. I.	*	7	7	7

*Prices for No. 1 fuel in S. O. New Jersey and Socony-Vacuum territories same as for kerosine which see in tank wagon table for various cities: prices change with kerosine.

	No. 1	No. 2	No. 3	No. 4
ATLANTIC REFINING				
Philadelphia, Pa.	7.75	7.00	7.00	7.00
Allentown, Pa.	8.25	7.50	7.50	7.50
Wilmington, Del.	8.25	7.50	7.50	7.50
Springfield, Mass.	9.00	7.50	....	7.50
Worcester, Mass.	9.00	7.50	....	7.50
Hartford, Conn.	9.00	7.50	....	7.50

S. O. OHIO		
*Ohio Statewide	8.00	8.00 7.50 6.75

Note: S. O. Ohio prices are for hose dumps, bucket dumps are 0.5c per gallon higher.

*Except Cleveland Division and City of Toledo. In Cleveland Division (Cuyahoga, Lake and Geauga counties), No. 1 price is same as statewide; Nos. 2, 3 and 4 are 0.5c higher; No. 5 is priced 0.25c lower than No. 4. In Toledo No. 2 is 0.5c lower than statewide, others same.

S. O. INDIANA

Stanolex Fuel and Furnace Oils

	No. 1 Fuel	Stanolex Furnace
Chicago	†8.8	7.00
Indianapolis	...	*11.8
Detroit	...	7.1
Milwaukee	8.1	7.4
Minneapolis	7.5	7.5
Sioux City	7.2	7.2
St. Louis	7.5	6.8
Kansas City	6.6	6.6

*Includes state tax of 4c.

†This price applies to 1 to 99 gals. deliveries; 150 gals. and over, 7c.

Note: Small-lot deliveries of light fuel oils range up to 2c higher than above quotations.

REFINERY TANK CAR MARKETS

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days) unless otherwise stated. Prices in cents per gallon, except heavy fuel oils in dollars per barrel, wax and petrolatums in cents per pound in barrels, tank car lots, f.o.b. refineries in districts designated, except where otherwise noted. Inter-refinery and export prices not included unless so stated in the respective markets. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M. D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted

Cylinder Stocks (cont'd)

Prices Effective	Dec. 27	Dec. 20
Mid-Continent (cont'd)		
120 Vis. at 210° D:		
0 to 10 p.p.	15.00	15.00
10 to 25 p.p.	14.50	14.50
25 to 40 p.p.	14.125	14.125
600 S.R. Dark Green	5.00 – 7.50	5.00 – 7.50
600 S.R. Olive Green	7.00 – 9.50	7.00 – 9.50
631 S.R.	‡12.50	‡13.50
Black Oil	3.50 – 4.00	3.50 – 4.00
CHICAGO (Viscosity at 210°)		
Unfiltered Steam Refined:		
140	9.00	9.00
160	10.00	10.00
200	11.00	11.00
Bright stocks, 160 vis. at 210. No. 8 color:		
0 to 10 p.p.	17.75	18.75
15 to 25 p.p.	16.75	17.75
30 to 40 p.p.	16.25	17.25
E filtered Cyl. Stock	14.50	14.50

To obtain prices delivered in Chicago, add 0.25c per gal.

‡Only one refiner quoting.

Prices Effective	Dec. 27	Dec. 20
***WESTERN PENNA.**		
600 S.R. filterable	7.50 – 8.00	7.50 – 8.00
650 S.R.	10.50 –11.50	10.50 –11.50
600 fl.	11.00 –12.00	11.00 –12.00
630 fl.	14.00 –16.00	14.00 –16.00
600 Warren E	13.00 –13.50	13.00 –13.50

*Quotations only.

Bright stock, 145-155 vis. at 210°, 540-550 flash, No. 8 color:

10 p.t.	18.00 –18.50	18.00 –18.50
15 p.t.	17.00 –17.50	17.00 –17.50
20 p.t.	16.00 –16.50	16.00 –16.50
25 p.t.	15.00 –16.00	15.00 –16.00

Petrolatums

WESTERN PENNA. (Per lb., in barrels, carload lots. In tank cars, 0.5c per lb. less).

Snow white	6.625– 6.75	6.625– 6.75
Lily White	5.625– 5.75	5.625– 5.75
Cream White	4.625– 4.75	4.625– 4.75
Light Amber	2.75 – 2.875	2.75 – 2.875
Amber	2.50 – 2.625	2.50 – 2.625
Red	2.125– 2.375	2.125– 2.375

Wax

Prices Effective	Dec. 27	Dec. 20
WESTERN PENNA. (Per lb., f.o.b. New York basis.)		
122-124 w.c. scale, A.m.p.	2.85	*2.85
124-126 w.c. scale, A.m.p.	2.85	*2.85

*Correction: These prices correct for Dec. 20.

OKLAHOMA (Per lb. in bbls.; in a few instances, per lb. in burlap bags)

124-126 w.c. scale, A.m.p.	3.00	3.00

CHICAGO (In bags, carload lots. Melting points are E.M.P. (A.S.T.M.) methods; add 3° F. to convert into A.m.p.)

Fully refined:		
122-124	4.65 – 4.75	4.65 – 4.75
125-127	4.90 – 5.00	4.90 – 5.00
127-129	5.05 – 5.15	5.05 – 5.15
130-132	**5.45 – 5.55	**5.45 – 5.55
132-134	**5.70 – 5.80	**5.70 – 5.80
135-137	**6.45 – 6.55	**6.45 – 6.55

**Same prices quoted in bags or slabs loose.

MID-WESTERN TANK CAR MARKET

Prices are those made by Chicago sellers, on Group 3 (Oklahoma) freight basis, although shipments may originate in other South-western or Mid-western refining districts

Gasoline

Prices Effective	Dec. 27	Dec. 20
U. S. Motor: (Octane Test L-3)		
62 oct. and below	3.75 – 4.25	3.75 – 4.25
63-66 oct.	4.00 – 4.50	4.00 – 4.50
67-69 oct.	4.375– 4.625	4.375–4.625
70-72 oct.	4.50 – 5.00	4.625– 5.125
60-62, 400 e.p.	Prices discont.	3.875– 4.25
64-66, 375 e.p.	**4.25	**5.00
68-70, 350-360 e.p.	**5.25	**5.25

Kerosine

41-43 w.w.	4.125– 4.25	4.125– 4.25
42-44 w.w.	4.25 – 4.375	4.25 – 4.375

**One seller quoting.

Fuel *and* Gas Oils

Prices Effective	Dec. 27	Dec. 20
Domestic:		
No. 1 p.w.	4.00 – 4.375	4.125– 4.25
No. 1 straw	4.00 – 4.125	3.875– 4.00
No. 2 straw	3.75 – 3.875	3.75 – 3.875
No. 2 dark	3.625– 3.75	3.625– 3.75
No. 3	3.50 – 3.625	3.50 – 3.625
No. 4	$1.05 –$1.10	$1.05 –$1.10
No. 5	$0.80 –$0.85	$0.80 –$0.85
Range oil	4.125– 4.50	4.125– 4.25
Industrial:		
No. 4	$0.95 –$1.10	$0.95 –$1.10
No. 5	$0.775–$0.85	$0.775–$0.85

Prices Effective	Dec. 27	Dec. 20
Industrial (cont'd)		
No. 6	$0.55 –$0.65	$0.55 –$0.65
U. G. I. gas oil	2.875– 3.25	2.875– 3.25

Naphtha and Solvent

Stoddard solvent	6.875	6.875
Cleaners' naphtha	7.375	7.375
V. M. & P. naphtha	7.375	7.375
Mineral spirits	6.375	6.375
Rubber solvent	7.375	7.375
Lacquer diluent	8.375	8.375

DAILY GASOLINE PRICES

Daily range of gasoline prices as reported in PLATT'S OILGRAM (Week Ended Dec. 23, 1937)

	Dec. 20	Dec. 21	Dec. 22	Dec. 23
U. S. Motor, (Octane Number determined according to L-3 Method):				
62 octane and below:				
Oklahoma	4.00 – 4.375	4.00 – 4.375	4.00 – 4.375	4.00 – 4.375
*North Texas	†4.50 – 4.875	†4.50 – 4.875	†4.50 – 4.875	†4.50 – 4.875
West Texas	4.625– 4.75	4.625– 4.75	4.625– 4.75	4.625– 4.75
Mid-Western (Group 3 basis)	3.75 – 4.25	3.75 – 4.25	3.75 – 4.25	3.75 – 4.25
63-66 octane:				
Oklahoma	4.375– 4.75	4.375– 4.75	4.375– 4.75	4.375– 4.75
*North Texas	†5.00 – 5.375	†5.00 – 5.375	†5.00 – 5.375	†5.00 – 5.375
West Texas	5.125– 5.25	5.125– 5.25	5.125– 5.25	5.125– 5.25
Mid-Western (Group 3 basis)	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50	4.00 – 4.50
67-69 octane:				
Oklahoma	4.625– 4.875	4.625– 4.875	4.625– 4.875	4.625– 4.875
*North Texas	†5.375– 5.75	†5.375– 5.75	†5.375– 5.75	†5.375– 5.75
West Texas	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625	5.50 – 5.625
Mid-Western (Group 3 basis)	4.375– 4.625	4.375– 4.625	4.375– 4.625	4.375– 4.625
70-72 octane:				
Oklahoma	5.00 – 5.375	5.00 – 5.375	5.00 – 5.375	5.00 – 5.375
*North Texas	†5.625– 6.00	†5.625– 6.00	†5.625– 6.00	†5.625– 6.00
West Texas	5.875	5.875	5.875	5.875
Mid-Western (Group 3 basis)	4.625– 5.125	4.625– 5.125	4.625– 5.125	4.625– 5.125
Motor Gasoline, 60-64 oct.				
New York harbor	†6.75	†6.75	†6.75	†6.75
Philadelphia district	†7.00	†7.00	†7.00	†7.00
Baltimore district	†6.75 – 7.25	†6.75 – 7.25	†6.75 – 7.25	†6.75 – 7.25
Motor Gasoline, 65 oct. & above:				
New York harbor	†7.00	†7.00	†7.00	†7.00
Philadelphia district	†7.00 – 7.25	†7.00 – 7.25	†7.00 – 7.25	†7.00 – 7.25
Baltimore district	†7.00 – 7.50	†7.00 – 7.50	†7.00 – 7.50	†7.00 – 7.50
U. S. Motor, 58-62°:				
Other districts (Western Penna.)	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00
Motor Gasoline, Min. 65 oct.:				
Bradford-Warren (Western Penna.)	†7.25 – 7.50	†7.25 – 7.50	‡7.25	‡7.25
Other districts (Western Penna.)	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25	6.75 – 7.25

*For shipment to Texas and New Mexico destinations; Group 3 prices are quoted on northern shipment.
†Nominal.
‡Only one refiner quoting.

TANK WAGON MARKETS

Tax column includes 1c federal tax, state gasoline tax, also city and county taxes as indicated in footnotes, and inspection fees, as shown in general footnotes. These prices in effect Dec. 27, 1937, as posted by principal marketing companies at their headquarters offices, but subject to later corrections

S. O. New Jersey

ESSOLENE

	Consumer Tank Car	Dealer T.W.	Taxes	Kerosine T.W.
Atlantic City, N. J.	7.25	8.75	4	9
Newark, N. J.	7.25	8.75	4	9
Annapolis, Md.	8.35	9.85	5	9.5
Baltimore, Md.	7.75	9.25	5	9
Cumberland, Md.	9.15	11.65	5	10
Washington, D. C.	8	9.5	3	9.5
Danville, Va.	8.95	11.45	6	12.9
Norfolk, Va.	7.75	10.25	6	11.5
Petersburg, Va.	8.05	10.55	6	11.7
Richmond, Va.	8.05	10.55	6	11.7
Roanoke, Va.	9.25	11.75	6	12.9
Charleston, W. Va.	8.55	11.05	6	12.6
Parkersburg, W. Va.	7.85	10.35	6	11.2
Wheeling, W. Va.	8.85	10.25	6	12.2
Charlotte, N. C.	9.15	11.65	7	12.6
Hickory, N. C.	9.65	12.15	7	13
Mt. Airy, N. C.	9.45	11.95	7	12.8
Raleigh, N. C.	8.75	11.25	7	12.1
Salisbury, N. C.	9.25	11.75	7	12.7
Charleston, S. C.	7.75	10.25	7	11.1
Columbia, S. C.	8.75	11.25	7	12.1
Spartanburg, S. C.	9.45	11.95	7	12.9

Price basis to undivided dealers: Dealer t.w. price less 0.5c per gal.

Price basis to commercial consumers: To contract accounts, purchasing at least one full compartment at a time by hose connection: Effective March 12, 1937, in New Jersey, and March 8 in Maryland, District of Columbia, and in Arlington and Fairfax Counties in Virginia, on yearly purchases: from 2,500 to 100,000 gals., consumer t.w. price at time and place of delivery; 100,000 gals. per year, consumer tank car price, plus 0.5c per gal. Generally consumer t.w. price in foregoing states is equivalent of dealer t.w. price, less 0.5c per gal.

Effective May 15, 1937, on Essolene and Esso (by tank wagon) in North and South Carolina, West Virginia and Virginia (except Arlington and Fairfax Counties, which see above), commercial consumers taking deliveries of 50 gals. (West Va. 100 gals.) or more at one time will be billed at the posted consumer t.w. price. Deliveries less than 50 gals. (West Va. 100 gals.) will be billed at 4c per gal. over posted consumer t.w. price. Generally, posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Kerosine Discount: 1c off t.w. price for 25 gals or more, under contract thru territory (Baltimore City contract not necessary) except no discount in state of New Jersey.

Socony-Vacuum Oil Co., Inc.

(S. O. New York Division)

SOCONY MOBILGAS

	Consumer Tank Car	"Split" Dealer T.W.	Taxes	Total "Split" Dealer T.W.	Kerosine T.W.
Metropolitan N. Y. City: Boroughs of Manhattan, Bronx and Brooklyn (Kings and Queens)	7.5	9.5	*5	14.5	9
Borough of Richmond (Staten Is.)	7.5	9.5	*5	14.5	9
Albany, N. Y.	7.5	9.5	5	14.5	9
Binghamton, N. Y.	8.25	10.3	5	15.3	9
Buffalo, N. Y.	8.04	10.05	5	15.05	7.5
Jamestown, N. Y.	7.78	10.8	5	15.8	8.25
Plattsburg, N. Y.	7.9	10.4	5	15.4	9.5
Rochester, N. Y.	8.17	10	5	15	8.5
Syracuse, N. Y.	8.12	9.5	5	14.5	9.5
Danbury, Conn.	7.8	9.8	4	13.8	9
Hartford, Conn.	7.6	9.6	4	13.6	8.5
New Haven, Conn.	7.5	9.5	4	13.5	8
Bangor, Me.	8.1	8.8	5	13.8	9.5
Portland, Me.	7.5	9.8	5	14.8	8.75
Boston, Mass.	7.5	9	4	13	8.5
Concord, N. H.	8.2	11.3	5	16.3	9.5
Lancaster, N. H.	9.1	12.3	5	17.3	10.25
Manchester, N. H.	8	10.8	5	15.8	9.5
Providence, R. I.	7.5	9.5	4	13.5	8.5
Burlington, Vt.	7.9	10.4	5	15.4	9.5
Rutland, Vt.	8.2	10.7	5	15.7	9

*Plus 2% city sales tax computed at time of each sale.

Note: Socony-Vacuum has transferred all service stations to dealers; no prices available

Price basis to undivided dealers: 0.5c less than "split" dealer t.w

Price basis to commercial consumers: Effective about Nov. 15, 1936 in New York and New England, for tank wagon delivery: monthly purchases of 25,000 gals. or over, pay consumer tank car price at point of delivery, plus 0.5c gal.; monthly purchases of 5,000 to 25,000 gals., pay undivided dealer tank wagon price at point of delivery; monthly purchases of less than 5,000 gals., pay divided dealer tank wagon price at point of delivery. Private consumers pay undivided dealer tank wagon price at point of delivery, plus 2c gal.

Atlantic Refining

ATLANTIC WHITE FLASH GASOLINE

	Commercial Tank Car	All Tax	Total Dealer T.W.	S.S.	Kerosine T.W.
Philadelphia, Pa.	7.25	5	13.25	17	10.5
Pittsburgh	8	5	15	20	11
Allentown	7.75	5	14.25	**	11
Erie	8	5	14.5	**	10
Scranton	8	5	14.5	**	11
Altoona	8	5	15	**	11
Harrisburg	7.5	5	14	**	11
Williamsport	8	5	15	**	11
Dover, Del.	...	5	14.5	**	11
Wilmington	...	5	14	**	11
Boston, Mass.	...	4	13	**	8.5
Springfield, Mass.	...	4	13.3	**	8.5
Worcester, Mass.	...	4	14.3	**	9
Fall River, Mass.	...	4	12.5	**	8.5
Hartford, Conn.	...	4	13.6	**	9
New Haven, Conn.	...	4	13.5	**	9
Providence, R. I.	...	4	13.5	**	8.5
Atlantic City, N. J.	...	4	12.75	**	9
Camden, N. J.	...	4	12.75	**	9
Trenton, N. J.	...	4	12.75	**	9
Annapolis, Md.	...	5	14.85	**	9.5
Baltimore, Md.	...	5	14.25	**	9
Hagerstown, Md.	...	5	15.25	**	10
Richmond, Va.	...	6	16.55	**	11.7
Wilmington, N. C.	...	7	17.35	**	11.3
Brunswick, Ga.	...	7	16	**	*13
Jacksonville, Fla.	...	8	17	**	10

*Georgia has kerosine tax of 1c per gal., not included in above price.

**Atlantic Refining transferred stations to dealers; no prices available.

Price basis to undivided dealers: Dealer t.w. less 0.5c per gal.

Price basis to commercial consumers: in Penna. and Delaware, effective Mar. 11, 1937, on yearly gasoline purchases to contract accounts taking full compartment hose deliveries, using 100,000 gals. or more per year, tank car price plus 0.5c per gal.; consumers taking less than 100,000 gals., undivided dealer price. Consumers under contract and not under contract, taking less than full compartment delivery, and consumers not under contract taking full compartment delivery, get divided dealer price. Consumers taking less than 25 gals., t.w delivery, get 4c above undivided dealer price.

Discount on kerosine: Effective Oct. 29, 1936, in Pennsylvania and Delaware. 2c per gal. off t.w. price on t.w. deliveries of 25 gals. or more at one time.

S. O. Ohio

SOHIO X-70 GASOLINE

(Regular Grade)

	All Tax	Consumer T.W.	†Divided Dlr.	Kerosine T.W.
Ohio State-wide	5	16	15	*13
Counties where prices are below statewide:				
Columbiana, Defiance and Pickaway	5	15.5	14.5	....
Franklin, Knox and Paulding	5	15	14	....

RENOWN GASOLINE

(Third Grade)

Ohio State-wide	5	15.5	14.5	....
Counties where prices are below statewide:				
Columbiana, Defiance and Pickaway	5	15	14	....
Franklin, Knox and Paulding	5	14.5	13.5	....
Counties where prices are above statewide:				
Butler, Clermont, Darke, Greene, Hamilton, Miami, Montgomery, Preble and Warren	5	16	15	....

S. O. Ohio Cont'd

KEROSINE PRICES

(Off Statewide Level)

Kerosine prices are off statewide level in the following counties:

Allen, Auglaize, Champaign, Columbiana, Darke, Geauga, Greene, Hardin, Logan, Mahoning, Mercer, Preble, Putnam, Shelby, Trumbull, Union, Van Wert and Wyandot	*12.5
Paulding	*12
Ashtabula	*11.5
Fayette, Licking, Madison, Pickaway, Portage and Summit	*9.5

*Kerosine prices include 1c state tax.

Commercial Tank Wagon Q.D.A. to contract accounts: Effective Oct. 20, 1937, thru Ohio (except in 25 counties), on monthly purchases, off posted consumer t.w. price: 0 to 999 gals., 0.5c; 1,000 to 19,999 gals., 1.5c; 20,000 gals. and over, 2.5c. The 25 counties where Q.D.A. differs from statewide are: Allen, Auglaize, Champaign, Darke, Defiance, Erie, Fulton, Geauga, Hamilton, Henry, Logan, Lorain, Lucas, Meigs, Mercer, Ottawa, Paulding, Putnam, Sandusky, Scioto, Shelby, Van Wert, Washington, Williams and Wood.

†This price also to authorized agents, exclusive of 0.5c rental.

Sales tax: Ohio's 3% sales tax, effective Jan. 27, 1935, is added "where assessable, to regular posted prices," S. O. Ohio says.

On kerosine, prices to resellers and commercial consumers are posted generally at 3c per gal. below consumer t.w. price in any quantity, when such prices are on statewide level.

S. O. Kentucky

CROWN GASOLINE

(Regular Grade)

	Consumer T.W.	All Tax	Total Consumer T.W.	Net Dlr.	Kerosine T.W
Covington, Ky.	13	6	19	16	11
Lexington, Ky.	13.5	6	19.5	16.5	11
Louisville, Ky.	13	6	19	16	10.5
Paducah, Ky.	13.5	6	19.5	16.5	10
Jackson, Miss.	13	7	20	17	*13
Vicksburg, Miss.	13	7	20	17	*13
Birmingham, Ala.	14	*8	22	19	12
Mobile, Ala.	13	*9	22	19	11
Montgomery, Ala.	13	*9	22	19	*14.5
Atlanta, Ga.	14	7	21	18	*12
Augusta, Ga.	14	7	21	18	*14
Macon, Ga.	14	7	21	18	*14.5
Savannah, Ga.	12	7	19	16	*12
Jacksonville, Fla.	12	8	20	17	10
Miami, Fla.	12.5	8	20.5	17.5	12.5
Pensacola, Fla.	13	*9	22	19	12
Tampa, Fla.	11	8	19	16	10.5

KYSO GASOLINE

(Third Grade)

Covington, Ky.	11	6	17	14.5	....
Lexington, Ky.	11.5	6	17.5	15	....
Louisville, Ky.	11	6	17	14.5	....
Jackson, Miss.	11.5	7	18.5	16	....
Vicksburg, Miss.	11.5	7	18.5	16	....
Birmingham, Ala.	12	*8	20	17.5	....
Mobile, Ala.	10.5	*9	19.5	17	....
Montgomery, Ala.	10.5	*9	19.5	17	....
Atlanta, Ga.	12	7	19	16.5	....
Augusta, Ga.	12	7	19	16.5	....
Macon, Ga.	12.5	7	19.5	17	....
Savannah, Ga.	10.5	7	17.5	15	....
Pensacola, Fla.	11	*9	20	17.5	....

Discounts to all tank wagon consumers: Effective Jan. 4, 1937, thru territory, on Crown gasoline, 3c per gal. below consumer t.w. price; on Kyso, 2.5c below, regardless of quantity purchased, per month.

Discounts on kerosine: Prices in Kentucky are net, but in other states subject to 2c discount.

**Taxes*: in the tax column is included these city and county gasoline taxes at the following points: Mobile, 2c city; Birmingham, 1c city; Montgomery, 1c city and 1c county; Pensacola, 1c city. Georgia and Mississippi kerosine prices include 1c state tax. Montgomery kerosine price includes 1c city tax.

Above prices include these inspection fees on both gasoline and kerosine, per gallon, figured on basis of 50 gallons per barrel:

Alabama, 1/40c on gasoline, 1/2c on kerosine; Arkansas, 1/5c per gal. in a single barrel. 1/20c per gal. in bulk; Florida, 1/8c; Illinois, 3/100c; Indiana, 1/5c per gal. in lots up to 25 bbls.; 2/25c per gal. in lots of 25 bbls. or more; Kansas, 1/50c, (3/50c can be charged to meet inspection department expenses); Louisiana, 1/32c; Minnesota, 1/25c; Missouri, 3/100c; Nebraska, 3/100c; Nevada, gasoline 1/20c; North Carolina, 1/4c; North Dakota, 1/20c; Oklahoma, 2/25c per gal. in lots of more than 50 bbls., 1/5c in lots less than 50 bbls.; South Carolina, 1/8c; South Dakota, 1/10c; Tennessee, 2/5c; and Wisconsin, 2/25c.

Kerosine inspection fee only: Iowa, 3/50c; Michigan, 1/5c per gal.

TANK WAGON MARKETS

Tax column includes 1c federal tax, state gasoline tax, also city and county taxes as indicated in footnotes, and inspection fees, as shown in general footnote. These prices in effect Dec. 27, 1937, as posted by principal marketing companies at their headquarters offices, but subject to later corrections

S. O. Indiana

	Red Crown Cons. Tax	Dealer Prices Red Crown T.W.	Stanolind T.W.	Kerosine T.W.
Chicago, Ill.	4	15.3	13.3	12.1	10.2
Decatur, Ill.	4	15.3	13.8	13.1	10.2
Joliet, Ill.	4	15.3	13.8	12.1	10.2
Peoria, Ill.	4	15.3	13.8	13.3	10.2
Quincy, Ill.	4	15.1	13.6	12.5	10
Indianapolis, Ind.	5	16.9	15.4	14.7	*14.8
Evansville, Ind.	5	16.8	15.3	13.1	*14.7
South Bend, Ind.	5	17.2	15.7	14.2	*14.2
Detroit, Mich.	4	15.1	13.6	13.1	9.8
Grand Rapids, Mich.	4	16.3	14.8	14.3	11
Saginaw, Mich.	4	16.1	14.6	14.1	*9.1
Green Bay, Wis.	5	17	15.5	14.8	10.9
Milwaukee, Wis.	5	16.5	15	14.2	10.4
La Crosse, Wis.	5	16.7	15.2	14.7	10.6
Minneapolis-St. Paul.	5	16.7	15.2	14.7	10.6
Duluth, Minn.	5	17	15.5	15	10.9
Mankato, Minn.	5	16.7	15.2	14.7	9.5
Des Moines, Ia.	4	15.1	13.6	11	*13
Sioux City, Ia.	4	15.3	13.8	13.3	*13.2
Davenport, Ia.	4	15.3	13.8	13.3	*13.2
Mason City, Ia.	4	15.4	13.9	13.4	*13.3
St. Louis, Mo.	*4	14.9	13.4	11.2	9.8
Kansas City, Mo.	*4	14.6	13.1	12.6	8.5
St. Joseph, Mo.	*4	14.6	12.4	12	9
Fargo, N. D.	4	16.7	15.2	14.7	11.6
Minot, N. D.	4	17.9	16.4	15.9	12.8
Huron, S. D.	*5	17.1	15.6	15.1	*11
Wichita, Kans.	4	14.1	12.4	10.5	8.5

*Taxes: in the tax column is included these city and state gasoline taxes at following points: Kansas City, St. Joseph and St. Louis, 1c city tax; South Dakota, 0.1c sales tax. State Kerosine taxes: Indiana, 4c; Iowa, 3c, all included in above prices.

Discount to commercial consumers: Effective Jan. 1, 1935, thru territory, except Michigan effective Feb. 1, on purchases per month, discount off t.w. prices; all gasolines, 25 to 1,000 gals., at t.w. price; 1,000 gals., or more, 1.5c off t.w. on Ethyl and Red Crown, and 1c on Stanolind (latter effective June 9, 1937). Minimum delivery is 25 gals.

S. O. Nebraska

STANDARD RED CROWN GASOLINE

	All Tax	T.W. Total	Dealer Total	Kerosine T.W.
Omaha, Neb.	6	17.7	16.2	10.5
McCook	6	18.1	14.1	11.1
Norfolk	6	18.1	16.6	10.9
North Platte	6	18.5	17	11.3
Scottsbluff	6	19.2	16	12

Discounts to commercial consumers: for tank wagon deliveries covered only by Standard Commercial Consumer Contract, effective January 1, 1935.

S. O. Louisiana

ESSOLENE

	Consumer Tank Car	Dealer T.W.	Taxes	Kerosine T.W.
Little Rock, Ark.	7.75	10.25	7.5	11.5
Alexandria, La.	7.75	10.25	8	*10.5
Baton Rouge, La.	7.25	9.75	8	*12
New Orleans, La.	7.25	9.75	*10	*12
Lake Charles, La.	8.25	10.75	8	*12.5
Shreveport, La.	6.75	9.25	8	*9.5
Lafayette, La.	8.25	10.75	8	*13
Bristol, Tenn.	10.25	11.5	8	14.5
Chattanooga, Tenn.	9.75	12.25	8	13.5
Knoxville, Tenn.	10.25	12.75	8	14
Memphis, Tenn.	8.25	10.75	8	12
Nashville, Tenn.	9.25	11.75	8	11.5

*New Orleans gasoline tax includes 7c state, 1c federal, and 2c parish tax. Louisiana kerosine prices include 1c state tax; in addition New Orleans has 1c parish tax.

Price basis to dealers: Undivided dealers get dealer price, less 0.5c.

Price basis to commercial consumers: Effective May 15, 1937, thru territory; commercial consumers taking 50 gals. or more at one time will be billed at posted consumer t.w. price; those taking less than 50 gals. at one time will be billed at 4c per gal. over posted consumer t.w. price. Generally, the posted consumer t.w. price will be equivalent to the dealer price less 0.5c per gal.

Humble Oil & Refining Co.

HUMBLE MOTOR FUEL

	*T.W.	*Total Taxes	Total T.W.	S.S.	Kerosine T.W.
Dallas, Tex.	8.5	5	13.5	17	8
Ft. Worth, Tex.	9	5	14	18	8
Houston, Tex.	9.5	5	14.5	18.5	8
San Antonio, Tex.	9.5	5	14.5	18.5	8

U. S. Motor Gasoline
(Third Grade)

Dallas, Tex.	7	5	12	14
Ft. Worth, Tex.	7.5	5	12.5	15
Houston, Tex.	8.5	5	13.5	16.5
San Antonio, Tex.	8.5	5	13.5	16.5

*Price is t.w. price to all classes of dealers and consumers.

Price basis to "open" dealers: discount off posted retail price: when posted retail price, including all taxes on Esso motor fuel is: 19.1c per gal. and above, discount is 3.5c; 19c to 18.1c, 3c, and 18c and below, 2.5c. Humble motor fuel, 17.1c and above, 3.5c; 17 to 16.1c, 3c; and 16c and below, 2.5c; U. S. motor fuel, 15.1c and above, 2.5c; 15 to 14.1c 2c; and 14c and below, 1.5c.

Continental Oil

	Conoco Bronze Ex-Tax	Dealer Prices All Tax	Total Conoco Bronze	Demand	Kerosine T.W.
Denver, Colo.	10	5	15	14	11.5
Grand Junc., Colo.	14	5	19	18	15
Pueblo, Colo.	11	5	16	14	10.5
Casper, Wyo.	12	5	17	16	11.5
Cheyenne, Wyo.	11	5	16	10	13
Billings, Mont.	13.5	6	19.5	18	15.5
Butte, Mont.	13.5	6	19.5	16.5	15.5
Great Falls, Mont.	13.5	6	19.5	18.5	15.5
Helena, Mont.	13.5	6	19.5	18.5	15.5
Salt Lake City, Utah	14.5	5	19.5	16.5	16
Boise, Ida.	15.5	6	21.5	20.5	18
Twin Falls, Ida.	15	6	21	20	18
Albuquerque, N. M.	11	†6.5	17.5	16.5	12
Roswell, N. M.	11	†6.5	17.5	15	10.5
Santa Fe, N. M.	12	*7	19	16.5	12
Muskogee, Okla.	9.5	5	14.5	13	7
Oklahoma City, Okla.	9	5	14	11	8
Tulsa, Okla.	9	5	14	11	6
Ft. Smith, Ark.	9.75	5	14.75	13.5	8
Little Rock, Ark.	9.75	7.5	17.25	15.125	9.5
Texarkana, Ark.	9	5	14	11	8.5

†Includes city tax of 0.5c.
*Includes 1c city tax.

S. O. California

STANDARD GASOLINE

	T.W.	Taxes	Total T.W.	S.S.	Kerosine T.W.
San Francisco, Cal.	13.5	4	17.5	18.5	11.5
Los Angeles, Cal.	13	4	17	18	10
Fresno, Cal.	14.5	4	18.5	19.5	12.5
Phoenix, Ariz.	15	6	21	22	†17
Reno, Nev.	15	5	20	21	13
Portland, Ore.	14	6	20	21	13.5
Seattle, Wash.	14	6	20	21	13.5
Spokane, Wash.	16.5	6	22.5	23.5	16
Tacoma, Wash.	14	6	20	21	13.5

FLIGHT GASOLINE
(Third Grade)

San Francisco, Cal.	12	4	16	17	....
Los Angeles, Cal.	11.5	4	15.5	16.5	....
Fresno, Cal.	13	4	17	18	....
Reno, Nev.	13.5	5	18.5	19.5	....
Phoenix, Ariz.	13.5	6	19.5	20.5	....
Portland, Ore.	12.5	6	18.5	19.5	....
Seattle, Wash.	12.5	6	18.5	19.5	....
Spokane, Wash.	15	6	21	22.5	....
Tacoma, Wash.	12.5	6	18.5	19.5	....

†Includes 5c state tax.

Discount to dealers: on gasoline, off t.w. price on Standard Ethyl and Standard Gasoline, to 100% dealers, 3c; to split dealers, 2c; on Flight gasoline, both 100% and split dealers, 2c.

On Stanavo Aviation Gasoline, to all classes of dealers, 3c off t.w.

To commercial consumers: off tank wagon price: on single deliveries of 40 gallons and over, Stanavo Aviation, Standard Ethyl and Standard Gasolines, 3c. Flight Gasoline, 2c per gallon. Tank wagon delivery, less than 40 gals., 1c per gal. above posted t.w. price.

On kerosine in tank car, transport truck and trailer delivery, 3c off t.w. price; plant deliveries to jobbers, 2.5c below t.w.

Canada

PRICES OF IMPERIAL OIL LTD.

Per Imperial Gallon, which is 1.2 U. S. Gallons

3-STAR IMPERIAL GASOLINE

	T.W.	Taxes	Total T.W.	Kerosine T.W.
Hamilton, Ont.	16	6	22	17
Toronto, Ont.	16	6	22	17
Brandon, Man.	22.8	7	29.8	22.3
Winnipeg, Man.	20.5	7	27.5	20.7
Regina, Sask.	21.5	7	28.5	22
Saskatoon, Sask.	24.3	7	31.3	24.8
Edmonton, Alta.	21	7	28	23
Calgary, Alta.	18.5	7	25.5	20.5
Vancouver, B. C.	16	7	23	23
Montreal, Que.	15	6	21	17.5
St. John, N. B.	16	8	24	18.5
Halifax, N. S.	16	8	24	18.5

Note: Imperial Oil Ltd. has completed transfer of service stations to dealers; no s.s. prices available.

Discounts to undivided dealers, 1c off t.w. price, except Maritime Provinces where undivided dealers pay t.w. price. Divided dealers pay t.w. price, thru territory.

Aviation Gasoline

Following are tank car and/or tank wagon prices of aviation gasoline in principal marketing territories (Stanavo aviation in all territories except where otherwise noted) Tax column includes 1c federal tax, and state tax; also municipal taxes as indicated in footnotes. Prices in first four territories do not include state or federal taxes.

S. O. NEW JERSEY

	*Ethyl T.C.	Tank Car	T.W.
Bayonne, N. J.	19.5	9.5	12.5
Baltimore, Md.	....	10	13
Washington, D. C.	....	....	13.5
Richmond, Va.	....	....	14.7
Greensboro, N. C.	....	....	15.7
Raleigh, N. C.	....	....	17.6
Charleston, W. Va.	....	....	12.2

*This is Stanavo Ethyl Aviation Gasolin 100 octane number, tank car price.

COLONIAL BEACON OIL CO.

	T.W.
Brooklyn, N. Y.	12.8
Buffalo, N. Y.	14.5
Boston, Mass.	15

S. O. PENNSYLVANIA

Philadelphia, Pa.	13.6
Pittsburgh, Pa.	14.4

S. O. LOUISIANA

New Orleans, La.	13.3
Shreveport, La.	13.6

Prices in above four territories are on a 74 octane grade aviation gasoline except where otherwise noted. An 80 octane product generally brings 0.5c premium and an 87 octane product, 1.5c premium over the 74 octane grade.

Note: S.s. prices in above four territories are generally 6c over t.w. prices. Above t.w. prices are net, with no discounts allowed for quantity purchases. T.w. prices are generally tank car price, plus freight, plus 2.5c per gal.

S. O. OHIO
Thru Ohi
Stanavo Ethyl Aviation

	Consumer T.W.	Tax	Total Consumer T.W.
73 octane	15.5	5	20.5
80 octane	16.5	5	21.5
87 octane	17.5	5	22.5

Discounts: For delivery on contract to hangar operators and resellers: 2c below consumer posted t.w. price, shown above

S. O. INDIANA
Stanolind Aviation Gasoline
(73 octane number at Kansas City; 62 octane at other published points)

Chicago, Ill.	14.6	4	18.6
Detroit, Mich.	16.1	4	20.1
Milwaukee, Wisc.	14.8	5	19.8
Minneapolis, Minn.	15	5	20
St. Louis, Mo.	14.2	3	17.2
Kansas City, Mo.	13.9	*4	17.9
Fargo, N. D.	16	4	20
Huron, S. D.	15.4	5	20.4

*Includes 1c city tax.

HUMBLE OIL & REFINING CO.

	Tank Car
Baytown, Tex. (exclusive of taxes)	8.5

CONTINENTAL OIL CO.

Conoco Special Gasoline Dealer	Tax	Total Dealer
Denver, Colo.	5	18
Cheyenne, Wyo.	5	20
Helena, Mont.	6	22.5
Salt Lake City, Utah	5	22.5
Albuquerque, N. M.	*6.5	26.5

*Includes city tax of 0.5c

S. O. CALIFORNIA

	T.W.	Total T.W.
Phoenix, Ariz.	17	23
Los Angeles, Cal.	15	19
San Francisco, Cal.	15.5	19.5
Reno, Nev.	17	22
Portland, Ore.	16	22
Seattle, Wash.	16	22
Spokane, Wash.	18.5	24.5

Note: For discounts, etc., see note under Standard and Flight gasoline above

TANK WAGON MARKETS

Tax column includes 1c federal tax, state gasoline tax, also city and county taxes as indicated in footnotes, and inspection fees, as shown in general footnote. These prices in effect Dec. 27, 1937, as posted by principal marketing companies at their headquarters offices, but subject to later corrections

Naphtha (In Tank Wagon)

S. O. NEW JERSEY

Posted Tank Wagon Prices

	Mineral Spirits	V.M.&P.
Newark, N. J.	11.5	15.5
Baltimore, Md.	15.5	....
Washington, D. C.	15	....

Discounts: Buyers taking following quantities, at one time, get these discounts: Newark, 2c per gal. on 200 gals. or more; less than 200 gals., 0.5c higher price. Baltimore 2c off on 25 to 100 gals. and 3c on over 100 gals. Washington, 2c off to contract buyers.

SOCONY-VACUUM OIL CO.

Buffalo, N. Y.	13	14
New York City	10.5	11.5
Rochester, N. Y.	13	15
Syracuse, N. Y.	14	15
Boston, Mass.	13.5	14
Bridgeport, Conn.	12.5	14
Hartford, Conn.	12	13.5
Providence, R. I.	13.5	14.5

ATLANTIC REFINING CO.

Philadelphia, Pa.	11.5	12.5
Lancaster, Pa.	13	14
Pittsburgh, Pa.	12.5	14.5

Note: Prices for Mineral Spirits also apply to Stoddard Solvent; and prices for V.M.&P. Naphtha apply also to Light Cleaners Naphtha.

S. O. OHIO

	S.R. Solvent	V.M.&P. Naphtha
Thru Ohio	13.25	13.75

Note: V.M.&P. Naphtha prices also apply on Dry Cleaners naphtha and special Varnolene; Varnolene and Sohio Solvent 0.5c below these prices. Discounts to contract consumers, off t.w. price: 300 to 999 gals., 0.5c; 1,000 to 2,499 gals., 0.75c; 2,500 to 4,999 gals., 1c; 5,000 or more gals., 1.5c.

S. O. INDIANA

(Prices include state and federal taxes)

	Oleum Spirits	V.M.&P. Naphtha	Stanisol
Chicago, Ill.	15.9	16.2	15.6
Detroit, Mich.	19.3	18.3	19.4
Kansas City, Mo.	14.4	15.4	14.4
St. Louis, Mo.	14.7	15.7	14.6
Milwaukee, Wis.	19.3	20.3	19.3
Minneapolis, Minn.	19.5	20.5	18.1

Note: Prices for V. M. & P. apply also to Light Cleaners Naphtha. All prices, with exception of Missouri points, include state tax. Prices shown are base prices, before discounts.

Naphtha (In Tank Cars)

In Tank Cars (F. o. b. refinery or seaboard terminal except Ohio, delivered price.)

	V.M.&P. Naphtha	Solvent
Baltimore	11	10
New York Harbor	10.5-11	9.00-9.5
Philadelphia district	11	10
Boston	10.5	10
Providence	10.5	10
Ohio points, delivered	9.375	*8.50

*This is on rubber solvent.

Note: In Ohio, prices on D.C. naphtha and special Varnolene are same as V.M.&P.; on Varnolene and Sohio Solvent, prices are 0.5c less than on V.M.&P.

Latest Changes

From Dec. 21 to Dec. 27 inclusive. Dates and amounts of changes shown. See table for full current prices.

S. O. Ohio—All motor gasolines:
Cut 0.5c, thru Ohio, Dec. 24, to new statewide t. w. price of 16c for X-70 and 15.5c for Renown. All depressed areas were included in the cut except unchanged were Defiance and Paulding counties.
Posted t. w. price to commercial consumers, which had been posted in 13 counties, discontinued.
S. O. Indiana—Stanolind:
Des Moines, dealer price cut 1.1c, Dec. 24.
Continental Oil—Conoco Bronze:
Texarkana, dealer price cut 0.5c, Dec. 21.
S. O. California—All gasolines:
Spokane, t. w. cut 0.5c, Dec. 21.
Kerosine:
Los Angeles and Phoenix, up 1c; Fresno, up 0.5c and Spokane, cut 0.5c, Dec. 21.

Corrections

Notation of amount of change and dates not previously shown in table. Table in this issue is corrected to show these changes.

S. O. Louisiana—Kerosine:
New Orleans, t. w. up 1c, Dec. 11.
Continental Oil—Demand:
Cheyenne, dealer price cut 1c, Dec. 14.
Texarkana, dealer price cut 1.5c, Dec. 20.

Aviation Gasoline

S. O. New Jersey—Stanavo:
Baltimore, up 0.5c, Dec. 15.
Washington, up 0.4c, Dec. 15.

Federal Gasoline Tax Receipts Up 10%

WASHINGTON, Dec. 27.—Federal receipts from the four direct U. S. taxes on the petroleum industry amounted to $228,679,102 during the first 11 months of 1937, compared with $206,592,049 during the same period of 1936, a gain of more than 10 per cent, according to figures released by the Internal Revenue Bureau.

The gasoline tax contributed the major portion of the receipts—$185,439,672 in 1937, compared with $169,837,990 last year. Receipts from the lubricating oil tax in the 11-month period of 1937 were $31,123,114, compared with $26,444,387 in 1936; from the tax on pipeline transportation, $11,229,656, compared with $9,520,027 in 1936, and from the various "Ickes taxes" on processing of crude petroleum, etc., $886,659 compared with $789,644.

B. O. D. A. Elects Officers

CHICAGO, Dec. 28. — Frank E. Spencer, Spencer Petroleum Co. was re-elected president of the Burning Oil Distributors Association of Chicago at annual meeting here.

Julius Loeffler, Commerce Petroleum Co., was re-elected vice-president; R. E. Curran, re-elected treasurer; and F. B. Caldwell, secretary.

C. S. Rosenthal, Apex Motor Fuel Co., and O. L. Peterson, George C. Peterson Co., were re-elected to the board of directors.

The present B. O. D. A. board consists of F. E. Spencer, Julius Loeffler, and R. E. Curran, in addition to Rosenthal and Peterson.

CHICAGO, Dec. 28.—Sewell L. Avery was elected a director of Pure Oil Co. by the board today. Avery is president of Montgomery Ward & Co., and of U. S. Gypsum Co., and a director of the U. S. Steel Corp. and the Pullman Co.

Pa. Refinery Lubricating Oil Inventory

(Issued as of Dec. 16 by National Petroleum Assoc.)

	Gallons
1. **Raw Long Residuum** (Including all raw long residuum below, and not salable, as 600 fire)	1,245,413
2. **600 Steam Refined** (Includes all steam refined stock commonly sold or used as 600 and as raw material for bright stocks)	9,577,779
3. **Other Steam Refined** (Not included in 1 and 2 above)	5,790,807
4. **Finished Dewaxed Long Res.**	2,986,444
5. **Bright Stock** (Does not include any materiel reported in 4, above)	16,837,730
6. **Viscous Neutral,** below 180 vis. but not below 142 vis. @ 100	6,171,705
7. **Viscous Neutral,** 180 vis. @ 100 and above	8,795,232

Prospecting Permits Are Extended

WASHINGTON, Dec. 27.—Secretary Ickes has issued an order extending to Dec. 31, 1938, all oil and gas prospecting permits on the public lands outstanding on Dec. 31 this year, the Interior Department announced.

The extension, Ickes said, was prompted by administrative delays incident to determining what permits are eligible to be extended to Dec. 31, 1939, under the act of August 26, 1937, and by his desire to grant an additional period of grace to holders of permits with respect to which equities are claimed but which are not extended by that act.

Permits which, on Dec. 31, 1937, do not fall in one or more of the five classes of permits specified in the act of August 26 are not granted an extension to Dec. 31, 1939, by that act, and cannot under any circumstances qualify for or become legally entitled to any extension beyond Dec. 31, 1938.

Most of the 12,000,000 acres of public lands subject to the estimated 8000 permits outstanding at the time of passage of the act are located in California, Wyoming, Montana and New Mexico. (N. P. N., Sept. 1, p. 20—Also gives classifications subject to extension through 1939).

SEABOARD MARKETS, EXPORT AND COASTWISE

All prices on this page are publisher's opinion of open market quotations or sales, for spot shipment (10 to 15 days). In cargo markets, spot shipment is 90 days. Prices in cents per gallon, except heavy fuel oil in dollars per barrel, in tank car lots, f.o.b.refineries or seaboard terminals in districts designated, unless otherwise noted. Federal, state or municipal taxes not included. Prices quoted apply on products made from legally produced crude. Unless otherwise noted, gasoline octane ratings are determined by C.F.R. Motor method, A.S.T.M.D-357-33T; and lubricating oil specifications determined according to A.S.T.M. methods, unless otherwise noted.

Eastern Domestic

(Inter-refinery and export prices not included.)

MOTOR GASOLINE

Prices Effective	Dec. 27	
District:	*60-64 Oct.	*65 Oct. & Above
N. Y. harbor	6.75	7.00
†N.Y. harbor	6.50	6.75
Philadelphia	7.00	7.00 – 7.25
Baltimore	6.75 – 7.25	7.00 – 7.50
Norfolk	7.00 – 7.25	7.25 – 7.50
Wilmington, N. C.	7.00 – 7.25	7.25 – 7.50
Charleston, S. C.	7.00 – 7.25	7.25 – 7.50
Savannah	7.00 – 7.25	7.25 – 7.50
Jacksonville	7.00 – 7.25	7.25 – 7.50
Portland	7.00	7.25
Boston	6.75	7.00
Providence	6.75	7.00

*Prices are nominal. †Barge lots.

WATER WHITE KEROSINE

District:			
N. Y. harbor	6.25	Charleston	6.00–6.25
*N. Y. harbor	6.125	Savannah	5.75
Philadelphia	6.25	Jacksonville	5.75
Baltimore	6.25	Portland	6.75
Norfolk	6.00–6.25	Boston	‡6.25 — 6.40
Wilmington, N.C.	6.00–6.25	Providence	6.40

*Barge lots.

†FUEL OILS

	N. Y. harb.	N. Y. harb. barges
No. 1	6.25	6.125
Nos. 2-3	5.25	5.125
No. 4	5.25	5.00 – 5.125
No. 5	$1.45 –$1.55	.....
No. 6	$1.25	.....

	Phila. dist.	Balt. dist.
No. 1	6.25	6.25
Nos. 2-3	5.25	**5.25
No. 4	4.75 – 5.25	**5.25
No. 5	$1.45–$1.475	$1.45–$1.55
No. 6	$1.25	$1.25

	Bost. dist.	Prov. dist.
No. 1	‡6.25 – 6.40	6.40
Nos. 2-3	††5.40	††5.40
No. 4	††5.40	††5.40
No. 5	$1.45–$1.55	.....
No. 6	$1.25	.....

†Fuel oils meet specifications of U. S. Commercial Standards CS12-35.

**Some suppliers quote 5c f.o.b. terminal for shipment within Baltimore switching district.

††Some suppliers quote 5.40c delivered Boston and Providence districts.

‡Some suppliers quote 6.25c f.o.b. terminal; others 6.40c delivered Boston district.

District:	†Bunker C Fuel	†Diesel Oil
N. Y. harbor	***$1.25	**$2.20
Philadelphia	***$1.25	***$2.10–2.20
Baltimore	***$1.25	**$2.20
Norfolk	*$1.25	$2.20
Charleston	$1.20	$2.20
Savannah	*$1.20	$2.20
Jacksonville	*$1.20	$2.20
Tampa	*$1.20	$2.20
Portland	$1.35	$2.35
Boston	***$1.25	**$2.20
Providence	$1.25	$2.25

†In ship's bunkers.
*For barging add 5c per bbl.
**For barging add 6.5c to 7.5c per bbl.
***For barging add 5c to 6c per bbl.

	Gas Oil 28-34 Gravity	Diesel Oil Shore Plants
N. Y. harbor	5.25	5.25
Philadelphia dist.	5.00	....
Baltimore dist.	5.25	....
Norfolk dist.	5.25	....
Savannah dist.	....	5.25
Jacksonville dist.	....	5.25

Pacific Export

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gal., except where otherwise noted.)

Prices Effective	Dec. 27	Dec. 20
U. S. Motor, under 65 oct.	5.75 – 6.00	5.75 – 6.00
400 e.p. blend, under 65 oct.	6.00 – 6.125	6.00 – 6.125
400 e.p. blend 65 oct. & above	6.125– 6.375	6.125– 6.375
*38-40 w.w. kerosine	4.75 – 5.00	4.75 – 5.00
41-43 w.w. kerosine	5.00 – 5.50	5.00 – 5.50
44 w.w. kerosine	5.50 – 5.75	5.50 – 5.75

*150 fire point.

Prices Effective	Dec. 27	Dec. 20
In Cargo lots, per bbl.		
Diesel fuel, 24° & above	$1.45 –$1.50	$1.45 –$1.50
Diesel fuel, under 24°	$1.40 –$1.45	$1.40 –$1.45
*30-34 diesel (gas oil)	$1.55 –$1.65	$1.55 –$1.65
†Grade C fuel oil	$0.85 –$0.90	$0.85 –$0.90
In Ships' Bunkers, or deep tank lots, per bbl.:		
*Diesel fuel oil	$1.625–$1.65	$1.625–$1.65
†Grade C fuel oil	$0.975–$1.00	$1.075–$1.10
Cased Goods: (Per case)		
U. S. Motor	$1.45 –$1.575	$1.45 –$1.575
400 e.p. blend, 65 oct. & above	$1.55 –$1.675	$1.55 –$1.675
*40-43 w.w. kerosine	$1.25 –$1.325	$1.25 –$1.325
Kerosine, p.w.	$1.20 –$1.30	$1.20 –$1.30

*Pacific specification 200. †Pacific specification 400.

Note: For San Francisco cargo prices, add 5c per bbl. to above cargo prices.

*150 fire point.

New York Export

(Prices in cents per gal. in bbls. F.a.s. New York)

CYLINDER OILS (Pennsylvania Products)

Bright stock:			
Light, 25 p.t.	22.50 –23.00	22.50 –23.00
Dark, 25 p.t.	22.00 –22.50	22.00 –22.50
Neutral oil:			
200 3 color, 25 p.t.	26.00 –26.50	26.00 –26.50
150 3 color, 25 p.t.	24.00 –24.50	24.00 –24.50
600 Warren E filtered	20.50 –21.00	20.50 –21.00
600 s.r., unfiltered	15.00 –15.50	15.00 –15.50
650 s.r., unfiltered	18.00 –18.50	18.00 –18.50
600 fl., s.r.	18.50 –19.00	18.50 –19.00
630 fl., s.r.	22.50 –23.00	22.50 –23.00

Wax, Domestic *and* Export

(Prices in cents per lb. Tests made by A. S. T. M. methods. Melting points shown below, however, are A. M. P., 3° higher than A. S. T. M. (E.M.P.) melting points. Export prices are f.a.s. carload lots. Domestic prices are f.o.b. refineries in New York and New Orleans districts, in bags, carload lots, with 0.2c discount allowed for shipment in bulk. Scale, solid and fully refined, slabs in bags.)

Prices Effective	Dec. 27	
	New York	
	Domestic	Export
124-6 Y.C. scale	2.75 – 2.85	2.75 – 2.85
122-4 W.C. scale	2.80 – 2.90	2.80 – 2.90
124-6 W.C. scale	2.80 – 2.90	2.80 – 2.90
123-5 Fully rfd.	4.45	4.125– 4.375
125-7 Fully rfd.	4.55	4.25 – 4.375
128-30 Fully rfd.	4.80	4.50 – 4.625
130-2 Fully rfd.	4.95	4.75 – 5.00
133-5 Fully rfd.	†5.35	5.25 – 5.375
135-7 Fully rfd.	†5.60	5.50 – 5.75
	New Orleans	
	Domestic	Export
124-6 Y.C. scale	2.75 – 2.85	2.75 – 2.85
122-4 W.C. scale	2.80 – 2.90	2.80 – 2.90
124-6 W.C. scale	2.80 – 2.90	2.80 – 2.90
123-5 Fully rfd.	4.45	4.125– 4.375
125-7 Fully rfd.	4.55	4.25 – 4.375
128-30 Fully rfd.	4.80	4.50 – 4.625
130-2 Fully rfd.	4.95	4.75 – 5.00
133-5 Fully rfd.	†5.35	5.25 – 5.375

†Shipment either in bags or in bulk.

Gulf Coast

(Prices are f.o.b. ship at Gulf oil terminals representing opinions of traders, except prices specified to the contrary. Prices cover bulk shipments of 20,000 bbls. or more, unless otherwise noted.)

Prices Effective	Dec. 27	Dec. 20
For Domestic shipment:		
MOTOR GASOLINE		
59 oct. & below	*5.125– 5.25	*5.125– 5.25
60-64 oct. number	*5.25 – 5.375	*5.25 – 5.375
65 oct. & above	5.75 – 5.875	5.75 – 5.875
FUEL OILS		
No. 1	5.125	5.125
No. 2	4.50	4.50
No. 4	4.25 – 4.375	4.375
KEROSINE		
41-43 w w	5.125	5.125
For Export Shipment:		
GASOLINE		
U. S. Motor	5.125– 5.25	5.125– 5.25
60-62, 400 e.p.	5.25	5.25
61-63, 390 e.p.	5.25 – 5.375	5.25 – 5.375
64-66, 375 e.p.	5.25 – 5.375	5.25 – 5.375
*Nominal.		
KEROSINE		
44 w.w.	*5.50	*5.50
41-43 w.w.	5.125	5.125
41-43 p.w.	5.00	5.00

Prices Effective	Dec. 27	Dec. 20
GAS AND BUNKER OILS		
For Domestic and/or Export Shipment		
‡26-30 translucent gas oil	4.25 – 4.375	4.375– 4.50
‡30 plus translucent gas oil	4.50 – 4.625	4.50 – 4.625
‡30 plus transparent gas oil	4.50 – 4.625	4.50 – 4.625
Diesel Oil Ship's bkrs.	†$1.90	†$1.90
Grade C bunker oil for ship's bunkers	†$0.95	†$0.95
Grade C bunker oil, in cargoes	$0.85	$0.85

‡Less than ½ of 1% sulphur. †Barging 5c bbl. additional at some Gulf ports.

MEXICAN CRUDE AND BUNKER OILS
(F.o.b. Steamer, Tampico)

Heavy Panuco crude, taxes to be paid	*$0.96	*$0.96
Grade C bunker oil, ship's bunkers, taxes paid	$0.95	$0.95

MID-CONTINENT LUBRICATING OILS

(Prices in cents per gal., bulk export shipment, f.o.b. Gulf or as noted below)*

	Dec. 27	
190-200 vis. D 210 brt. stock	Barrels 24.00 –25.00	Bulk 18.00 –20.50
150-160 vis. D 210 brt. stock:		
0-10 p.p.	20.00 –20.50	14.00 –14.50
10-25 p.p.	20.00	13.50 –14.00
150-160 vis. E 210 brt. stock	19.50 –20.00	13.50
120 vis. D 210 brt. stock:	19.50 –20.00	13.50

*Second hand barrels.

	Dec. 27	Dec. 20
180 vis. No. 3 color neutral:		
0-10 p.p.	11.75 –12.00	11.75 –12.00
15-30 p.p.	11.25 –11.50	11.25 –11.50
200 vis. No. 3 color neutral:		
0-10 p.p.	12.25 –12.50	12.25 –12.50
15-30 p.p.	11.75 –12.00	11.75 –12.00
600 s.r. olive green	9.00 –11.25	9.00 –11.25
600 s.r. dark green	7.00 – 9.25	7.00 – 9.25

SOUTH TEXAS LUBRICATING OILS

(Vis. at 100° cold test 0, bulk export shipment, f.o.b. Gulf oil terminals.)

Unfiltered Pale Oils:

Vis.	Color		
100	No. 3	5.50	5.50
200	No. 3	7.25	7.25
300	No. 3	7.75	7.75
500	No. 3½	8.75	8.75
750	No. 4	9.25	9.25
1200	No. 4	9.75	9.75
2000	No. 4	10.00 –10.25	10.00 –10.25

Red Oils:

Vis.	Color		
100	No. 5-6	5.50	5.50
200	No. 5-6	7.25	7.25
300	No. 5-6	7.75	7.75
500	No. 5-6	8.75	8.75
750	No. 5-6	9.25	9.25
1200	No. 5-6	9.75	9.75
2000	No. 5-6	10.00 –10.25	10.00 –10.25

Note: Red oil prices shown above cover oils with green cast; prices for blue cast red oils are slightly lower in some cases.

Tanker Rates

(Approximate tanker freight rates to Continental ports, in shillings per ton of 2240 lbs., British sterling; to U. S. ports in cents per bbl.)

Rates Effective Dec. 27

	Crude &/or Fuel		Refined Oil &/or Spirits	
	Last Paid	Owners Ask	Last Paid	Owners Ask
Gulf-U.K./Cont.‡	25/6	26/-28/	35/	*35/
Aruba-U.K./Cont.‡	20/	21/-22/	22/	*27/6-28/6
Gulf-N. Atlantic** (not E. of N.Y.):				
Hvy. Crude & Fuel, (10 to 19.9 gravity)	33c	34c	....	....
Light Crude, (30 Grav. or Lighter)	30c	31c	....	....
Gasoline	....	....	*35c	*35c
Kerosine	....	....	*36c	*36c
Light Fuel	....	....	*37c	*37c

‡Continental ports in range between Bordeaux and Hamburg, both inclusive.

*Nominal.

**Venezuela loading same rate; Tampico 2c to 3c per bbl. additional.

CRUDE OIL MARKETS

Prices in $ per bbl. of 42 U. S. gals. at the well. A. P. I gravity. Prices are effective as of 7 a. m. of dates as given

EASTERN FIELDS

Posted by Joseph Seep Purchasing Agency

(Effective Dec. 1, 1937, except Corning Sept. 2, 1937)

Penna. Grade Oil in Southwest Penna. Pipe Lines.....$1.88
Penna. Grade Oil in Eureka Pipe Lines (West Virginia).....$1.82
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O.).....$1.70
Corning Oil in Buckeye Pipe Lines (Ohio)...$1.27

Posted by Other Companies

Tide Water Associated Oil Co.
Bradford-Allegany district (Penna. and N. Y.) (Effective Dec. 1, 1937).....$2.20
*The Pennzoil Co.: (Effective Dec. 1, 1937)
Penna. Grade Oil in National Transit Lines*$2.15
Ashland Oil & Transportation Co.:
Somerset Oil in Ashland Lines (Ky.):
(Effective Jan. 28, 1937)
Big Sandy River.....$1.42
Kentucky River.....$1.50

*The Pennzoil Co. posts $2.15 in Cochran, Franklin, Hamilton and Doolittle, Pa. fields; prices in other lower districts range down to $2.10 per bbl. at well.

MICHIGAN

Posted by Pure Oil Co.

Midland, Midland County (July 23, 1937)...$1.27

Posted by Simrall Pipe Line Corp.

(Effective July 22, 1937)

West Branch, Arenac, and equal grades.....$1.09

(Effective July 23, 1937)

Beaverton, Crystal, Greendale, Porter and equal grades.....$1.27
Buckeye.....$1.245

(Effective July 1, 1937)

Billings and Tobacco.....$1.395

CENTRAL STATES FIELDS

Posted by Ohio Oil Co.

(Effective Jan. 28, 1937)

Illinois, Princeton.....$1.35
Owensboro (Western Ky.).....$1.40

(Effective Nov. 20, 1937)

Lima, O.....$1.00

Posted by Stoll Oil Refining Co.

(Effective Feb. 1, 1937)

Stoll Pipe Line Oil (Ky.).....$1.40

CANADIAN FIELDS

Posted by Imperial Oil Limited

Western Ontario

(Effective Sept. 9, 1933)

Petrolia.....$2.10
Oil Springs.....$2.17

Alberta—Turner Valley

(Prices f.o.b. field tankage)

(Effective Sept. 1, 1937)

Clear Naphtha, 65 grav. & above.....$2.36

Crude Oil & Discolored Naphtha

40-40.9°	$1.36	53-53.9	$1.62
41-41.9	1.38	54-54.9	1.64
42-42.9	1.40	55-55.9	1.66
43-43.9	1.42	56-56.9	1.68
44-44.9	1.44	57-57.9	1.70
45-45.9	1.46	58-58.9	1.72
46-46.9	1.48	59-59.9	1.74
47-47.9	1.50	60-60.9	1.76
48-48.9	1.52	61-61.9	1.78
49-49.9	1.54	62-62.9	1.80
50-50.9	1.56	63-63.9	1.82
51-51.9	1.58	64-64.9	1.84
52-52.9	1.60	65° & higher, for discolored naphtha only	2.36

Note: Clear naphtha: 22 color; 10 lbs. vapor pressure, Reid method; 90% recovery; end point, 410°. Discolored naphtha; same specifications as for clear naphtha except color.

MID-CONTINENT

Posted by Stanolind Crude Oil Purchasing Co., Jan. 28, 1937

	(In Oklahoma-Kansas*)	(In North-North Central Texas)
Below 29	$1.06	$0.96
29-29.9	1.08	0.98
30-30.9	1.10	1.00
31-31.9	1.12	1.02
32-32.9	1.14	1.04
33-33.9	1.16	1.06
34-34.9	1.18	1.08
35-35.9	1.20	1.10
36-36.9	1.22	1.12
37-37.9	1.24	1.14
38-38.9	1.26	1.16
39-39.9	1.28	1.18
40 & above	1.30	1.20

Above Stanolind prices met as follows:

Jan. 28, Continental Oil Co. met in Okla., Kans., and North Texas. Sinclair-Prairie met in North Texas and North Central Texas, Jan. 28, Stanolind's North Texas schedule. Same date, The Texas Co. met in North-North Central Texas.

Note: Stanolind prices in Okla.-Kans. are for quantities computed by 97% tank tables. In Texas, 100% tank tables are used effective Oct. 1, 1937, volume corrected to 60° F., and deduction for full b.s. & w. content.

*Effective Aug. 1, 1937, for Otis-Albert pools Rush-Barton counties, Kans., 13c less.

Posted by Carter Oil Co.

In Oklahoma

(Effective Jan. 28, 1937)

Below 25	$0.98	33-33.9	$1.16
25-25.9	1.00	34-34.9	1.18
26-26.9	1.02	35-35.9	1.20
27-27.9	1.04	36-36.9	1.22
28-28.9	1.06	37-37.9	1.24
29-29.9	1.08	38-38.9	1.26
30-30.9	1.10	39-39.9	1.28
31-31.9	1.12	40 and above	1.30
32-32.9	1.14		

Above Carter schedule met Jan. 28 by the following companies: Sinclair-Prairie, Shell and Bransdall in Oklahoma-Kansas; Skelly Oil in Kansas; Tide Water in Oklahoma; Pure Oil in Oklahoma-Kansas, beginning with below 24 at $0.98 and ending with 40 & above at $1.30.

Posted by Magnolia Petroleum Co.

(Effective Jan. 28, 1937)

In Oklahoma, same schedule as Carter Oil, which see above, beginning with below 25, at $0.98 and ending with 40 & above, at $1.30.

In Texas: North and North Central, including Burkburnett, Archer, Henrietta, Electra, Comanche and Olden, same gravity and price schedule as Stanolind in North Texas, which see under Stanolind, beginning with below 29 at $0.96 and ending with 40 and above, at $1.20.

Beaumont, Tex.

(Effective Oct. 1, 1937)

Below 21°	$0.95	27-27.9	$1.15
21-21.9	0.98	28-28.9	1.17
22-22.9	1.01	29-29.9	1.19
23-23.9	1.04	30-30.9	1.21
24-24.9	1.07	31-31.9	1.23
25-25.9	1.10	32-32.9	1.25
26-26.9	1.13	33-33.9	1.27
		34 & above	1.29

TEXAS FIELDS

Posted by Humble Oil & Refining Co.

(*West Central Texas)

(Effective Jan. 28, 1937)

Below 29	$0.96	35-35.9	$1.10
29-29.9	0.98	36-36.9	1.12
30-30.9	1.00	37-37.9	1.14
31-31.9	1.02	38-38.9	1.16
32-32.9	1.04	39-39.9	1.18
33-33.9	1.06	40 and above	1.20
34-34.9	1.08		

*Includes Brown, Callahan, Coleman, Comanche, Eastland, Fisher, Haskell, Jones, Shackelford, Stephens, Throckmorton and Young counties.

Shell Petroleum Corp., effective Jan. 28, posts Humble's above schedule on Fisher county crude, plus these five lower grades, beginning with below 25 gravity at $0.88; 25-25.9, $0.90; 26-26.9, $0.92; 27-27.9, $0.94, and 28-28.9, $0.96; rest of schedule same as Humble's in West Central Texas.

Note: Effective Oct. 1, 1937, Humble prices are based on 100% tank tables at 60F.

*East Central Texas

(Effective Jan. 28, 1937)

Below 29	$1.03	35-35.9	$1.17
29-29.9	1.05	36-36.9	1.19
30-30.9	1.07	37-37.9	1.21
31-31.9	1.09	38-38.9	1.23
32-32.9	1.11	39-39.9	1.25
33-33.9	1.13	40 and above	1.27
34-34.9	1.15		

*Including Anderson, Cherokee, Limestone, Navarro counties.

Same date, Sinclair-Prairie met in Mexia Humble's above schedule.

PANHANDLE TEXAS

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

	Gray County	Carson-Hutchinson
Below 35	$0.96	$0.91
35-35.9	0.98	0.93
36-36.9	1.00	0.95
37-37.9	1.02	0.97
38-38.9	1.04	0.99
39-39.9	1.06	1.01
40 & above	1.08	1.03

Jan. 28, above prices met by Sinclair-Prairie and Magnolia in the entire area and by Continental in Carson-Hutchinson and by Texas Co. in Panhandle Sweet, same as Humble's Gray Co. and on Panhandle Sour, same as Carson-Hutchinson.

EAST TEXAS

(Effective May 22, 1937)

Stanolind, Humble, Shell, Sinclair-Prairie, Texas Co., and Magnolia.....$1.35

Shell also posted on Jan. 28, in Livingston area, Polk County, Texas, $1.27.

NORTHEAST TEXAS

(Posted by Humble, Jan. 28, 1937)

Talco.....$0.73

(Posted by Magnolia, Jan. 28, 1937)

Cass County and Panola County, Tex.:

Same gravity and price schedule as S. O. Louisiana posts for Rodessa, La., which see under that company.

(Posted by The Texas Co., Jan. 28, 1937)

Cass County.....$1.25

WEST TEXAS AND NEW MEXICO

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

(Including Andrews, Crane, Crockett, Ector, Glasscock, Howard, Winkler and Upton Counties, Texas and Lea county, New Mexico).

Below 26	$0.78	33-33.9	$0.94
26-26.9	0.80	34-34.9	0.96
27-27.9	0.82	35-35.9	0.98
28-28.9	0.84	36-36.9	1.00
29-29.9	0.86	37-37.9	1.02
30-30.9	0.88	38-38.9	1.04
31-31.9	0.90	39-39.9	1.06
32-32.9	0.92	40 & above	1.08
Pecos, West Texas			$0.91

Jan. 28, Magnolia met Humble in Crane, Upton, Howard, Glasscock, Mitchell and Winkler.

Shell Petroleum Corp., on Jan. 28, met Humble in Crane, Glasscock, Howard, Pecos (except Yates shallow pool), Winkler, and Upton counties, Tex., and in Lea County, N. Mex. On Jan. 28, Shell posted in Yates shallow pool in Pecos county, Tex., $0.81. June 4, 1937, Shell added Ector county to West Texas postings.

Jan. 28, Stanolind Oil & Gas Co. met Humble in Hendrick field, Winkler county.

Jan. 28, Texas Co. met Humble in Ward and Winkler counties, Tex., and Lea County, N. M.

April 20, 1937, Sinclair Prairie met Humble in Ward and Winkler, Tex. and Lea, N. M., counties, except that its gravity schedule ends with 36 and above, at $1.00.

Posted by Continental Oil Co.

(Effective Jan. 28, 1937)

Artesia, Jackson and Maljamar pools, N. M...$0.90

COLORADO

(Posted by Continental Oil Co.,

Effective Jan. 28, 1937)

Ft. Collins and Wellington

Below 29	$1.01	35-35.9	$1.15
29-29.9	1.03	36-36.9	1.17
30-30.9	1.05	37-37.9	1.19
31-31.9	1.07	38-38.9	1.21
32-32.9	1.09	39-39.9	1.23
33-33.9	1.11	40 & above	1.25
34-34.9	1.13		

Cannon City and Florence, Col.....$1.10

SOUTH AND SOUTHWEST TEXAS

Posted by Humble Oil & Refining Co.

(Effective Jan. 28, 1937)

Carroll, Clark, Darst Creek, Hilbig, Salt Flat and Zoboroski fields.....$1.09
Pettus.....$1.37 Van Zandt.....$1.10

(Effective Nov. 1, 1936)

Heyser heavy....$0.90 Placedo heavy..$0.90
Heyser light..... 1.15 Taft..... 0.95

Shell Pet. Corp. on Jan. 28, posted $1.09 in Salt Flat district, Tex.

Anahuac, Dickinson, Flour Bluff and Turtlebay

(Effective Jan. 28, 1937)

Below 31	$1.16	36-36.9	$1.28
31-31.9	1.18	37-37.9	1.30
32-32.9	1.20	38-38.9	1.32
33-33.9	1.22	39-39.9	1.34
34-34.9	1.24	40 and above	1.36
35-35.9	1.26		

Jan. 28, Magnolia met Humble in Darst Creek: posted $1.00 in Luling; $1.12 in Lytton Springs; $1.27 for Cleveland, Liberty county, Tex.; $1.15 in Hardin, Liberty county, Tex.

Jan. 28, 1937, The Texas Co. met Humble in Darst Creek.

Posted by Humble

Conroe, Raccoon Bend, Tomball and Satsuma

(Deep sand crudes)

(Effective Jan. 28, 1937)

Below 29	$1.20	35-35.9	$1.34
29-29.9	1.22	36-36.9	1.36
30-30.9	1.24	37-37.9	1.38
31-31.9	1.26	38-38.9	1.40
32-32.9	1.28	39-39.9	1.42
33-33.9	1.30	40 & above	1.44
34-34.9	1.32		

Jan. 28, Magnolia met Humble in Tomball and Texas Co. met Humble in Conroe, beginning with 35-35.9 gravity.

(Continued on next page)

CRUDE OIL MARKETS

(Continued from preceding page)

Posted by Humble

Mirando, Heavy and Light

(Effective July 6, 1937)

Below 21	$0.96	31-31.9	$1.18
21-21.9	0.98	32-32.9	1.20
22-22.9	1.00	33-33.9	1.22
23-23.9	1.02	34-34.9	1.24
24-24.9	1.04	35-35.9	1.26
25-25.9	1.06	36-36.9	1.28
26-26.9	1.08	37-37.9	1.30
27-27.9	1.10	38-38.9	1.32
28-28.9	1.12	39-39.9	1.34
29-29.9	1.14	40 & above	1.36
30-30.9	1.16		

July 6, Magnolia posted same schedule as Humble in Mirando.

July 6, 1937, Texas Co. posted for Duval-Mirando, $0.96 for below 21, plus 2c differential, to $1.12 for 28 & above.

NORTH LOUISIANA-ARKANSAS

Posted by Standard Oil Co. of Louisiana

(Effective Jan. 28, 1937)

(In Caddo, Homer, Haynesville, Sabine, De Soto, Sarepta, Carterville, El Dorado, Bunkie, and Miller county).

Below 25	$0.90	33-33.9	$1.08
25-25.9	0.92	34-34.9	1.10
26-26.9	0.94	35-35.9	1.12
27-27.9	0.96	36-36.9	1.14
28-28.9	0.98	37-37.9	1.16
29-29.9	1.00	38-38.9	1.18
30-30.9	1.02	39-39.9	1.20
31-31.9	1.04	40 and above	1.22
32-32.9	1.06		

Rodessa, La.

(Effective Jan. 28, 1937)

Below 25	$0.93	33-33.9	$1.11
25-25.9	0.95	34-34.9	1.13
26-26.9	0.97	35-35.9	1.15
27-27.9	0.99	36-36.9	1.17
28-28.9	1.01	37-37.9	1.19
29-29.9	1.03	38-38.9	1.21
30-30.9	1.05	39-39.9	1.23
31-31.9	1.07	40 and above	1.25
32-32.9	1.09		

Smackover, Ark. $0.90

Urania, La. (Arkansas Fuel Oil Co., Jan. 28, '37) $1.02

Tepetate, La. (Continental Oil, Jan. 28, '37) 1.24

Jan. 28, 1937, Magnolia met S. O. La.'s No. La.-Ark. gravity and price schedule in Pine Island, Haynesville, Bull Bayou and Cotton Valley, La., and in Eldorado and Rainbow districts, Ark.; and met S. O. La.'s Rodessa prices; and in Lockport, Iowa, Cameron Meadow, La., posted Humble's gravity and price schedule on Mirando. El Dorado East Field, Ark. price same as Smackover, effective Jan. 28, '37.

Jan. 28, The Texas Co. met S. O. La. in N. La., except that its gravity schedule begins with below 27 at $0.94. It posted $1.37 for Garden Island, La., $1.24 for LaFitte, La. and $0.90 for Smackover.

***GULF COASTAL FIELDS**

Posted by Humble Oil & Refining Co. and The Texas Co.

	(Effective Jan. 28, 1937) Humble	Texas	Saxet (Humble) (July 6 '37)
Below 18	$0.95	$0.90	....
18-18.9	for	0.92	....
19-19.9	below	0.94	....
20-20.9	21°	0.96	$1.01
21-21.9	0.98	0.98	1.03
22-22.9	1.01	1.01	1.05
23-23.9	1.04	1.04	1.07
24-24.9	1.07	1.07	1.09
25-25.9	1.10	1.10	1.11
26-26.9	1.13	1.13	1.13
27-27.9	1.15	1.15	1.15
28-28.9	1.17	1.17	1.17
29-29.9	1.19	1.19	1.19
30-30.9	1.21	1.21	1.21
31-31.9	1.23	1.23	1.23
32-32.9	1.25	1.25	1.25
33-33.9	1.27	1.27	1.27
34-34.9	1.29	1.29	1.29
35-35.9	1.31	for	1.31
36-36.9	1.33	oil	1.33
37-37.9	1.35	34°	1.35
38-38.9	1.37	and	1.37
39-39.9	1.39	above.	1.39
40 and above	1.41	....	1.41

*Humble's prices apply in these fields: Barbers Hill, Goose Creek, Hull, Humble, Liberty, Moss Bluff, Mykawa, Orange, Pierce Junction, Plymouth, Rabbs Ridge, Raccoon Bend (shallow sand), Refugio light and †heavy, Sour Lake, Spindletop, Sugarland and West Columbia. †Except these grades of Refugio heavy: effective July 6, 1937: Below 20, $0.95; 20-20.9, $1.01; 21-21.9, $1.03; 22-22.9, $1.05; 23-23.9, $1.07; 24-24.9, $1.09; and 25-25.9, $1.11; rest of schedule same as other Gulf Coastal crude.

Jan. 28, Sinclair-Prairie met above Humble schedule in full.

July 6, 1937, The Texas Co. posted for Refugio, which includes Greta, Saxet and Taft: $1.01 for below 21, plus 2c differential, to $1.17 for 28 & above.

Texas Co. postings in Gulf Coastal Texas include: Arriola, Five Corners, Ganado, Humble, Liberty, Magnet, Manvel, Markham, Mauritz, Pickett Ridge, Port Neches, Sour Lake, West Columbia and Withers. In Gulf Coastal Louisiana: Bay St. Elaine, Caillou Island, Dog Lake, Four Isle, Gillis, Horseshoe Bayou, Iberia, Lake Barre, Lake Pelto, Leesville and Port Barre.

ROCKY MOUNTAIN FIELDS

Posted by Stanolind Oil & Gas Co.

(Effective Jan. 28, 1937)

Salt Creek, Midway and Dutton Creek, Wyo., same schedule as Stanolind posts in Oklahoma, Kansas which see under Mid-Continent crude on previous page.

Greybull-Torchlight	$1.30
Iles, light, Col.	1.18
Iles, heavy	1.12
Hogback, N. M.	1.33
Big Muddy	1.23
Elk Basin, light	1.30
Grass Creek, light	1.30
Frannie light	0.82

(Effective Nov. 4, 1936)

Grass Creek, heavy	$0.62
Frannie heavy	0.62
Hamilton Dome, Wyo.	0.57

Posted by Ohio Oil Co.

(Effective Jan. 28, 1937)

Elk Basin, Wyo.	$1.30
Grass Creek, light	1.30
Rock Creek	1.205
Lance Creek	0.97

(Effective Nov. 16, 1937)

Sunburst, Mont.	$0.90

Posted by Continental Oil Co.

(Effective Jan. 28, 1937)

Cat Creek, Mont.	$1.40
Big Muddy, Wyo.	1.18
Lance Creek, Wyo.	0.97

CALIFORNIA, *Posted by Standard Oil of California*

All gravities above those quoted take highest price offered in the field. Prices effective Feb. 26, 1936, except Huntington Beach, Playa del Rey, Santa Fe Springs, Kern Front, Signal Hill (Long Beach) effective March 7, 1936; Elk Hills effective June 22, 1936; Lakeview Area, Aug. 19, 1936; El Segundo and Wilmington, Oct. 15, 1936; Greeley-Canal, Dec. 22, 1937.

Gravity	Signal Hill (Long Beach) El Segundo †Wilmington	Seal Beach	Alamitos Heights	Huntington Beach	Inglewood	Playa del Rey	Olinda Brea Canon	Athens Rosecrans	Dominguez	Torrance	Richfield	Whittier East Coyote (La Habra)	Montebello	West Coyote Hills	Santa Fe Springs	‡Newhall and others	Mountain View	Elk Hills	Buena Vista Hills Midway-Sunset Lakeview Area	Greeley-Canal (Kern County)	Lost Hills	Coalinga	Wheeler Ridge
14-14.9	$0.80	0.79	0.74	0.78	0.79	0.80	0.76	....	....	0.80	0.76	0.76	0.77	0.78	....	0.70	....	0.70	0.70	.....	0.70	0.70	....
15-15.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	.....	.70	.70	....
16-16.9	.80	.79	.74	.78	.79	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	.....	.70	.70	....
17-77.9	.80	.79	.74	.78	.81	.80	.76	....	....	.80	.76	.76	.77	.78	....	.70	....	.70	.70	.....	.70	.70	....
18-18.9	.80	.79	.74	.78	.84	.80	.78	....	....	.82	.76	.76	.77	.78	....	.70	....	.70	.70	.....	.70	.70	....
19-19.9	.82	.79	.74	.82	.87	.84	.81	....	....	.85	.76	.78	.77	.78	....	.70	.70	.74	.74	.....	.74	.71	.70
20-20.9	.85	.79	.74	.85	.90	.88	.84	....	....	.88	.78	.82	.77	.80	....	....	.70	.78	.78	.....	.78	.72	.70
21-21.9	.88	.79	.74	.89	.93	.93	.88	....	....	.91	.80	.85	.77	.84	.78	....	.73	.82	.82	.....	.82	.74	.70
22-22.9	.92	.82	.74	.92	.96	.98	.92	....	....	.93	.84	.89	.79	.88	.78	....	.77	.87	.87	.....	.86	.78	.72
23-23.9	.95	.86	.77	.96	.99	1.02	.96	.84	.79	.96	.88	.93	.82	.92	.78	....	.80	.92	.92	.....	.90	.82	.76
24-24.9	.99	.91	.80	1.00	1.02	1.06	.99	.88	.81	.99	.91	.96	.85	.96	.82	....	.84	.97	.97	.....	.94	.86	.79
25-25.9	1.03	.95	.82	1.03	1.05	1.11	1.03	.93	.83	1.02	.95	....	.89	.99	.86	....	.88	1.01	1.01	.....	.98	.90	.83
26-26.9	1.06	1.00	.85	1.07	1.09	1.16	1.06	.98	.86	1.05	.98	....	.92	1.03	.90	....	.91	1.06	1.06	.....	1.02	....	....
27-27.9	1.10	1.05	.88	1.11	1.12	....	1.10	1.03	.88	....	1.02	....	.96	1.06	.95	....	.95	1.10	1.10	$0.84	1.06	....	....
28-28.9	1.14	1.10	.90	1.14	1.15	....	1.14	1.07	.90	....	1.06	....	.99	1.10	.99	....	.99	1.15	1.15	.88	1.10	....	....
29-29.9	1.17	1.15	.93	1.18	1.18		1.17	1.12	.93	....	1.09	....	1.03	1.14	1.03	....	1.02	1.20	1.20	.92	1.14	....	....
30-30.9	1.21	1.19	.95	1.22	1.21		1.21	1.17	.95	....	....	....	1.07	1.17	1.08	....	1.06	1.25	1.25	.95	1.18	....	....
31-31.9				....	1.24		1.24	1.22	.97	....	....	....	1.11	1.21	1.12	....	1.09	1.29	1.29	.99			
32-32.9		*Elwood Terrace		....	1.27		1.27	1.27	1.00	....	....	....	1.14	1.25	1.16	....	1.13	1.34	1.34	1.03	Kettleman Hills		
33-33.9	....	1.28	....	....	....		....	1.32	....	....	....	....	1.18	1.28	1.20	....	1.17	1.38	1.38	1.07	....	1.19	....
34-34.9	....	1.32	....	....	....		....	1.37	....	....	....	....	1.22	1.32	1.25	....	1.20	....	....	1.11	....	1.23	....
35-35.9	....	1.35	....	....	....		....	1.42	....	....	....	....	1.25	....	1.29	....	....	....	....	1.15	....	1.27	....
36-36.9	....	1.39	....	....	....		....	1.46	....	....	....	....	1.29	....	1.33	....	....	....	....	1.19	....	1.31	....
37-37.9	....	1.43	....	....	....		....	1.51	....	....	....	....	1.32	....	1.37	....	....	....	....	1.23	....	1.35	....
38-38.9	....	....	....	....	....		....	1.56	....	....	....	....	1.36	....	1.42	....	....	....	....	1.27	....	1.39	....
39-39.9	....	....	....	....	....		....	1.61	....	....	....	....	1.40	....	....	....	....	....	....	1.31	....	1.43	....
40-40.9	....	....	....	....	....	F. O. B. Standard Pipe Line	....	1.66	....	....	....	....	1.43	....	....	....	....	....	....	1.34	....	....	....
41-41.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.38	....	....	....
42-42.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.41	....	....	....
43-43.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.45	....	....	....
44-44.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.49	....	....	....
45-45.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.53	....	....	....
46-46.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.56	....	....	....
47-47.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.60	....	....	....
48-48.9	....	....	....	....	....		....	....	....	....	....	....	....	....	....	....	....	....	....	1.64	....	....	....

*F. o. b. ship.

‡Also McKittrick, Kern River. Kern Front and Round Mountain $0.70 thru 19.9 gravity; no higher gravity quoted.

†Wilmington prices differ on gravities below 18.9. Prices are: 14-16.9, $0.75; 17-17.9, $0.77; and 18-18.9, $0.79; rest of schedule same as Signal Hill.

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Coming Meetings

1938

Independent Oil Jobbers Assn. of Okla., Oklahoma City, Okla., Jan. 13.

Society of Automotive Engineers, Book-Cadillac Hotel, Detroit, Mich., Jan. 10 to 14.

Gov. Marland's Petroleum Conservation Conference of Oil State Governors, Hot Springs, Ark., tentative date, Jan. 17.

American Road Builders Assn., Cleveland, Ohio, Jan. 17 to 21.

Northwest Petroleum Assn., North Dakota Division, Minot, N. D., Jan. 24 and 25.

Northwest Petroleum Assn., Minnesota Division, Hotel Radisson, Minneapolis, Jan. 27 and 28.

Kentucky Petroleum Marketers Assn., Brown Hotel, Louisville, Ky., Feb. 7, 8 and 9.

Kansas Oil Men's Assn., 24th annual convention and oil exposition, Hotel Broadview, Wichita, Kans., Feb. 14 and 15.

American Institute of Mining and Metallurgical Engineers, annual meeting, Engineering Societies Bldg., New York, N. Y., Feb. 14 to 18.

Association of Highway Officials of the North Atlantic States, Hotel Ambassador, Atlantic City, N. J., Feb. 16, 17 and 18.

Ohio Petroleum Marketers Assn., fifteenth annual meeting, Hotel Deshler-Wallick, Columbus, Ohio, Feb. 22, 23 and 24.

Wisconsin Petroleum Assn., Schroeder Hotel, Milwaukee, Wis., Feb. 22, 23 and 24.

Indiana Independent Petroleum Assn., Spring Convention and Refiners and Suppliers Exhibit, Hotel Severn, Indianapolis, Ind., March 2, 3 and 4.

Iowa Independent Oil Jobbers Assn. and trade exhibit. Fort Des Moines Hotel, Des Moines, Iowa, March 2, 3 and 4.

American Society for Testing Materials, Spring Regional Meeting and Group Committee Meetings, Seneca Hotel, Rochester, N. Y., March 7 to 12.

Society of Automotive Engineers, National Aeronautic Meeting, Mayflower Hotel, Washington, D. C., March 10 and 11.

American Assn. of Petroleum Geologists, 23rd annual meeting, Roosevelt Hotel, New Orleans, La., March 16 to 18.

American Society of Mechanical Engineers, Los Angeles, Calif., March 23, 24 and 25.

American Petroleum Institute, division of production, spring meeting, southwestern district, Blackstone Hotel, Fort Worth, Texas, March 24 and 25.